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FIRST AERO WEEKLY IN THE WORLD

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No. 1562
Vol. XXXIV

The AIRCRAFT ENGINEER AND AIRSHIPS

OFFICIAL ORGAN OF THE ROYAL AERO CLUB

The Paris Aero Show

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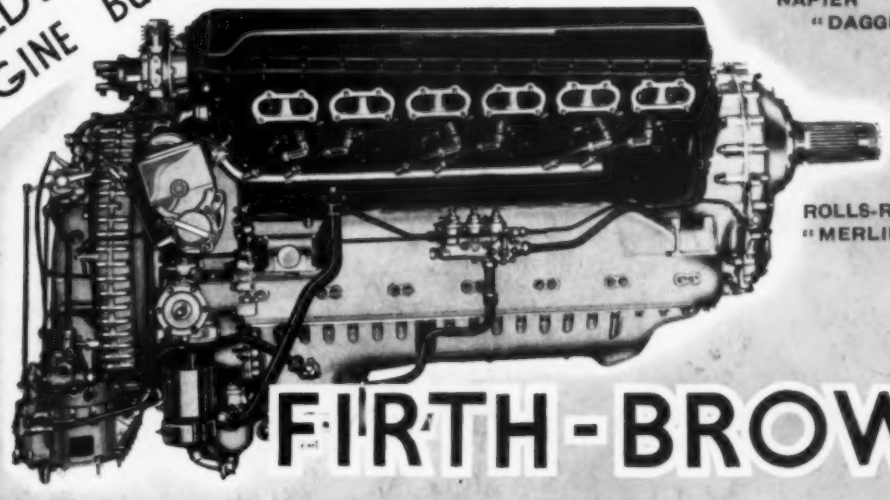

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The AIRCRAFT ENGINEER AND AIRSHIPS

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

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The Outlook

Paris, 1938

BY no stretch of the imagination could it be claimed that the Sixteenth Paris Aero Show is one of the most interesting of the series. In the matter of aircraft the show is ill-balanced. It is not merely that out of a total of 50 aircraft 27 are of the military type; that was to be expected. In fact, it is rather surprising that the military preponderance was not greater numerically. Rather is it due to the absence of the latest representatives of certain classes of aircraft, an absence readily understood but nevertheless regrettable.

In the military class the fact that the large four-engined bomber was represented by a full-scale mock-up, elaborate but still mock-up, detracted from the interest. It is fairly easy to make a mock-up look attractive, especially if such things as radiators and retractable undercarriages and gun positions are represented by unnaturally smooth coverings.

What the exhibition does indicate is the growing tendency towards using small twin-engined fighters. France, Holland and Poland show examples. Why this country should pretend to have no interest in the type, when all the world must know that we are developing it, is difficult to understand. But for this secrecy business we could have had one at the show instead of wasting space by exhibiting two examples of one type—the admirable Hurricane.

The Fokker D.23 reminded one that it *is* possible to find an alternative to the two-engines-in-the-wing layout. Whether the tandem arrangement is better or worse than the orthodox remains to be seen. The view straight ahead is a little worse, but in most other directions better. Aerodynamically there is probably little to choose, but torque reaction is reduced, and the moment of inertia around the longitudinal axis is presumably no greater than that of a single-engined machine of comparable area and weight. This should make it possible to execute more rapid manœuvres.

One of Each

WHAT helps to throw the show out of balance is the numerically poor representation of certain classes of aircraft. For instance, if one regards the Farman *Jules Verne* as an experimental machine, which it is, there is only the Potez 662 to represent the commercial aeroplane. Similarly, in the flying-boat class, there is but one example, the military Loire 130, which is "catapultable," but does not otherwise compare with our Supermarine Seagull.

Sub-stratosphere flying is represented by the Farman 2234, but whatever the machine may teach its designers, the flat-sided fuselage is about as ill-suited to a pressure cabin as anything could be.

One feature found on a very large proportion of the machines exhibited is the twin-rudder arrangement, with the fins and rudders placed at the ends of a tail-plane having a pronounced dihedral. This scheme is sometimes thought to be new, although early flying boats used triple rudders. Many years ago, before Germany was allowed to build military aircraft, there was a Junkers monoplane, built in Sweden, which had the twin-rudder tail. The object then was to give the rear gunner a better field of fire; nowadays it is also used as a convenient way of dividing the vertical surfaces into two small light ones in the slipstreams, and also rather increasing the effectiveness of the horizontal tail surfaces at the same time.

Adding Safety

IF a new "clearance" altimeter, which has been developed during the last two years in America by United Air Lines and the Western Electric Company, really does what is claimed for it, yet another transport flying difficulty will have been largely overcome. The instrument is, in fact, a radio transmitter and receiver, working on a very short wavelength. The time elapsing between the transmission and the reception of the signal

after it has been reflected by the earth is "measured." The same principle is used in depth-finding devices, though in this case, of course, the speed of sound forms the means of measurement.

Apparently the new device can be directed, so to speak, at any angle, so that instantaneous "sounding" can be made ahead of the flight path. Even so, the real danger in cloud flying over difficult country is that of arriving suddenly, when off-course, over very high ground. The "clearance" altimeter would, in this case, tell the pilot that the ground was rising in front of him, but it might not tell him in sufficient time to avoid the obstruction. That remains to be seen.

The greatest proportion of airline accidents in Europe, and particularly in America, involve off-course collisions with high ground. This new development will at least help to reduce the number of these accidents, and, what is more important, should give the pilot a clear indication of the fact that the ground over which he is passing is not that on his true track. In other words, the instrument might also be considered as a "blind map-reading" device. That has interesting possibilities.

Back to Biplanes?

SO universal has become the monoplane type of aeroplane, both in civil and military flying, that it may seem like rank heresy to suggest that we may see a return to the biplane.

When really high performance was demanded the biplane gave way to the monoplane, and the comparative ease with which the undercarriage could be retracted into the wings led to the adoption in most cases of the low-wing monoplane. In military aviation a certain amount of manœuvrability was sacrificed for speed.

The monoplane having thus become closely identified with speed, it may seem strange to suggest that if still greater speed is wanted we may be forced to revert to the biplane wing arrangement. Actually, there are both theoretical and practical grounds for making such a suggestion, as was pointed out to us by a famous designer.

Every student of aviation knows that there are portions of an aeroplane over which the air speed is very much greater than the forward speed of the aircraft as a whole. The top surface of the leading edge is one such. Already at the speeds being attained by modern fighters the air velocity in this region is approaching the speed of sound. If, therefore, the aircraft speed is to be pushed up to between 400 and 500 m.p.h., local air velocities may well reach or exceed the speed of sound.

At these great speeds, the thick wing with comparatively rounded leading edge which is of necessity a feature of all cantilever monoplanes offers too much drag, and it would appear that the only way to reduce this is to use a thin section. Unless such a wing is to be of prohibitive weight it will have to be arranged as a biplane. That is the argument, and it appears logical.

Settling the Stratosphere

UNTIL comparatively recently very little had been heard of the new "radio-sonde" balloons which should change the whole aspect of upper-air investigation problems. These balloons were described almost for the first time in the recently published Meteorological Office's Report for last year, and, more recently, Capt. Entwistle explained their good points in the paper which he read before the Royal Aeronautical Society.

For a number of years Service pilots, flying from Mildenhall, Duxford, and Aldergrove, have been doing extremely good work in flying up to 20,000ft. or more every day in order to take readings of upper-air conditions. It is reasonable to suppose that their work will now be supplanted by these new balloons, which automatically transmit by wireless the temperature, humidity, and pressure on the way up to their maximum altitude—which is very much higher than that attained by machines other than those specially designed for record purposes.

Now that we have the means for regular investigations of conditions up to a height, perhaps, of 30,000ft., the possibilities of stratosphere flying can be thoroughly considered. It will be remembered that one of the new landplanes which have been ordered by the Air Ministry will be designed with a pressure cabin. A great deal has been said in the past few years about the possibilities of really high-altitude transport, and this machine, with the data provided by the radio-sonde balloons, should help to settle the matter.

An Air Mail Anomaly

SOME people have an idea that there is nothing reprehensible in "diddling" (they would never say "cheating") the income-tax people, H.M. Customs, or a railway company. Sometimes the regulations of a Government department actually invite ingenious manœuvres, which cannot come under the head of diddling, but make the department do more work for less pay. An amusing case is reported from the Antipodes.

It is well known that the Home Post Office has arranged with Imperial Airways and Qantas Airways that a half-ounce letter shall be carried from Britain to Australia for 1½d., while the air mail from Australia to Great Britain costs 5d. for a similar letter. That is where the fun begins. Australian business firms which want to get their circulars quickly to this country do not relish paying 5d. for each of them. They have noticed that a letter from New Zealand to England, which goes by steamer to Sydney and thence by air, needs only a 1½d. stamp. The postage by steamer from Australia to New Zealand is 2d. So the ingenious Australians (doubtless of Scottish extraction) send their circulars to their agents in New Zealand, and the latter despatch them to England. The total postage comes to 3½d. in place of 5d., and yet there is a very useful saving of time on the steamer service home. The Australian Post Office loses 3d. (5d. less 2d.) of what it would have pocketed on each air letter sent direct, and the shipping company has to carry all the letters first to New Zealand and then back again—and yet there is no diddling at all in the matter. It is a most amusing game.

Mr. Runciman's Appointment

THE new company which is to combine Imperial Airways and British Airways will need both ability and experience on its Board, and the appointment of Mr. Walter Runciman ensures a considerable degree of both. In his various activities he has shown that he has inherited no small share of the ability of his father, Lord Runciman. As for experience, it is something to have on the Board a man who is a practical pilot, a holder of the Air Force Cross and the C.O. of No. 607 (County of Durham) (Fighter) Squadron. Experience of transport is of still more importance, and Mr. Runciman is a director of several shipping companies and of the L.N.E. Railway. He is also a director of Short Bros., and as such he must have given careful study to the orders for large flying boats and landplanes which Imperial Airways have placed with that firm. That study must have given him practical insight into the problems of air transport.

DIARY OF FORTHCOMING EVENTS—PAGE 508

The PARIS AERO SHOW

Heavy Predominance of Military Aircraft : New French Prototype Bombers and Fighters : Britain's Impressive Contribution : Atlantic Leviathans : A 2,400 h.p. Engine

(Illustrated Mainly with "Flight" Photographs and Sketches)

A CYNIC might well express the view that the *XVI^e Salon de l'Aviation* is the most futile of all the Paris Aero Shows. Futile because nobody has anything to show and would not be able to sell it if he had, for France, like every nation, wants all the machines it can build.

Certainly there would be more than a grain of truth in such a statement. The French Air Ministry refused to sanction the exhibition of several new and interesting types, and one cannot seriously blame them. For example, the twin-engined Amiot 370—similar to the 340 twin-engined bomber which some months ago carried General Vuillemin on his visit to Germany, had to be represented by a silver model on a pedestal in the middle of a large stand just inside the main entrance, where the actual machine would have been a striking exhibit. The 370 is a very fine aeroplane and has seven world's records to its credit. That these were established in two flights, one of which was over 2,000 km. (1,243 miles) and the other over 5,000 km. (3,107 miles) does not detract from their merit. The average speed of the former was 437 km./h. (271 m.p.h.) and beat the record for no load, 500 kg., 1,000 kg., and 2,000 kg. useful load. In the latter the average speed was 401 km./h. (249 m.p.h.) and the records beaten were for no load, 500 kg., and 1,000 kg. useful load. But the Air Ministry decided, not unreasonably, that as things are it is more important to get on with testing and development work. An ironical fact is that the prototype was exhibited at the last Paris Show two years ago.

By way of contrast, there were two large bombers which were little more than elaborate mock-ups. Quite a lot of time and money must have been spent on building them. But probably mock-ups of the essential parts would be made anyway, and it did not take much longer to complete the rest.

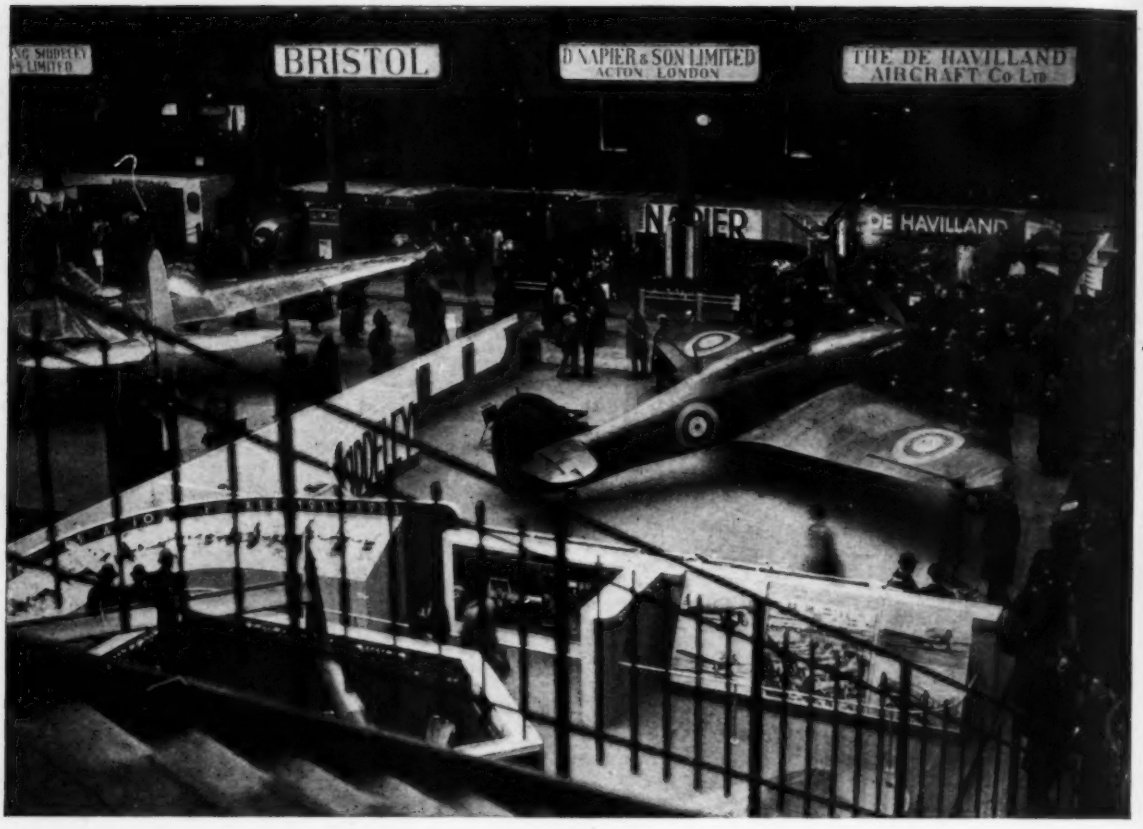
Analysed by numbers, this year's show discloses the surprising fact that exactly two commercial aeroplanes, apart from mock-ups, are shown! There are 27 military types (including trainers) 19 civil machines of the private-owner or ultra-light type, three experimental machines in the form of flying "scale models" of two large boats, and the Farman high-altitude monoplane.

A *Nationalised Industry*

Visitors familiar with previous Paris Aero Shows are probably slightly puzzled by the unfamiliar letters introduced by the nationalisation of most of the French aircraft factories. Apart from the effect of this nationalisation on production, the disappearance of the familiar names, such as Farman, Breguet, Bleriot, and their replacement by S.N.C.A., etc., is somewhat disconcerting when one is trying to identify a certain aircraft.

The nationalised aircraft factories were divided into six main groups, according to districts, and the words Société Nationale de Constructions Aéronautiques, or S.N.C.A. for short, are followed by the district denominations Centre, Midi, Nord, Ouest, Sud-Est and Sud-Ouest.

It is not even possible to explain quite briefly that such and such a group is composed of such and such constructors, because the grouping was carried out according to districts. Thus, one may find any one of the old constructors represented in several of the new groups by reason of his



The majority of the British contingent is grouped in this corner of the Salon. In the foreground are the Hawker Hurricane eight-gun fighter and the Bristol Blenheim bomber which are getting their due share of attention. In the lower picture is the Galtier 30 fighter developed by the Arsenal at Villacoublay.

having previously had works located in several districts.

Included in the Centre group are Hanriot and the old Farman works from which the brothers Henry, Maurice and Dick have retired; the managing director is M. Chalandre. The Midi group is composed of the Société Aéronautique Française and the managing director is M. Dewoitine. The Nord group has factories by several old constructors, chiefly Henry Potez, S.E.C.M., Mureaux, and Bréguet; the managing director is M. Henry Potez.

The group de l'Ouest is under the managing directorship of M. Marius Olive and includes old firms like Bréguet and Loire-Nieuport. Sud-Est is a large group and includes such well-known old firms as Lioré et Olivier, Potez, C.A.M.S., Romano, and S.P.C.A.; the managing director is M. Arène.

A Solid Bloch

Marcel Bloch is the dominating influence in the group du Sud-Ouest, and is managing director of the group. Associated with him are the Bréguet, Bleriot, and Lioré et Olivier works.

Although the engine firms such as Gnome-Rhone and Hispano-Suiza have escaped nationalisation, the French Government holds large numbers of shares. The old Lorraine firm has been nationalised under the title Société Nationale de Construction de Moteurs.

Of the foreign exhibitors, Great Britain makes the most convincing show with one long-nosed Blenheim, one Spitfire and two Hurricanes. All these machines are extremely businesslike and make one rather regret that more British firms are not represented. At least one other *could* have been at the show if the Air Ministry had not decided to show a Hurricane in addition to that exhibited by the

Although occupying a good deal of floor space the German exhibit includes only one full-scale machine, the Dornier Do. 17 bomber, seen in the foreground. This aeroplane makes an interesting comparison with the long-nosed Blenheim at the other end of the building.

Hawker firm. To show two machines of one type seems rather a waste of space.

It is somewhat curious that the one country with a national aircraft factory should be more strongly represented by military aircraft than any with the exception of France. The Polish P.Z.L. factory shows no fewer than five military aeroplanes and has a stand reaching right across the *Grande Nef* of the Grand Palais.

Germany's contribution is disappointing as regards full-scale aircraft, the Dornier Do.17 being the only machine on this impressive stand. And the machine is so mounted that one cannot get access to it but must be content with peeps through windows. The worm's eye view is impressive.

A Tandem Tricycle

Fokker has the only "novelty" in the show, a tandem-engined single-seater fighter with a tricycle undercarriage. It may be remembered that a few weeks ago *Flight* published a scale drawing of a design which a French constructor, Albert, put up to the French Air Ministry two or three years ago. Except for the tricycle undercarriage the general conception was the same. And, incidentally, the Fokker F.23 provides a good demonstration of the price one has to pay for the nose-wheel in the matter of extra weight and bracing, and the loss of internal stowage space by reason of the retracted nose-wheel. In the Albert design the idea was to have a shell-gun in the pusher engine so that the pilot could fire at his adversary when turning away after having delivered the attack with the front guns.

A high-light in the engine section is the first appearance in public of the Bristol Taurus. Generally similar to the Hercules, the Taurus (illustrated on p. 406a) is a slightly smaller version, and it is now permissible to state that the output is in the region of 1,000 h.p. The first announcement by Rolls-Royce of the new Merlin ratings when using 100-octane fuel was another surprise. The new Siddeley Cheetah XI promises to be an extremely useful engine with its smaller diameter and increased power, and one may expect Armstrong Siddeley Motors to concentrate on Cheetah production, especially as the earlier models have established a good reputation.

The Hispano-Suiza firm threw something of a bombshell into the British camp by exhibiting an "H" type liquid-cooled engine. British aviation circles have, of course, known for many months that the type has not been overlooked in England. The "Hisso" certainly looks a very clean piece of design, but it is shown without its ignition wiring, so that there is little to distract from its uncluttered exterior. The use of two superchargers "in parallel" is interesting, but one wonders whether it will be possible to ensure even distribution to the two sides. The Potez flat engine has reappeared, but this time it is entirely air-cooled, whereas the first time it was shown it was partly air-cooled and partly liquid-cooled.

For exhibition purposes there is nothing to compare with a sectioned engine, and the Pratt and Whitney Company deserve special praise for their sectioned Twin Wasp. This engine is cut clean through on the centre-line, and every last detail is thus made visible, even to the wiring of electric generators. That the section *is* right on the centre-line and not a small fraction to one side of it seems to be indicated by the fact that a glass is used to keep the bits and pieces in (and, of course, to prevent boys, young and old, from poking inquisitive fingers into the works)

The Show continues until December 11th.

A Morane M.406 taken straight off the production line for the French Air Force. There is an engine-mounted shell-gun and two machine guns in the wing. A Bronzavia flame-damping exhaust system is fitted to the Hispano 12Y engine.

MILITARY TYPES REVIEWED

Fighters

MOST unorthodox and interesting of the new Continental single-seater fighters is the Fokker D.23 twin-engined monoplane which at first sight suggests derivation from the G.1 or *Faucheur* two-seater shown last year. Actually the machine resembles the G.1 only in the method of carrying the tail on two booms.

An essential factor governing the lay-out was the provision of a good field of view for the pilot, who is located forward of the leading edge with one inverted Walter Sagitta in front and a second behind him driving a pusher airscrew. Thanks to the tricycle undercarriage the view while taxying is rather better than from most modern single-seaters.

Although the internal wing structure is not visible it is of interest because it departs from the standard Fokker methods, being all-metal with duralumin spars, ribs and covering. The fuselage or nacelle is of welded steel tubes and has integral engine mountings; it is covered with detachable duralumin and aluminium panels. The tail booms are of stressed duralumin construction.

Being sandwiched between two engines, the pilot is afforded a good measure of protection from enemy fire and his safety is further ensured by armour plating to the front and rear of his seat, just above the engines. Additional plates alongside the cockpit guard against lateral fire.

Each of the three wheels of the undercarriage is of the Argus type with an Olaer strut. The main wheels retract inwardly and the nose wheel in a rearward sense.

The particular Sagittas fitted are of the I.S.R. type giving 528 h.p. each at 13,400ft. The forward engine is cooled in a normal fashion, but the cooling air for the rear one enters through a scoop under the fuselage. Three-bladed fully feathering V.D.M. airscrews are fitted and the engines are supplied with a Garrelli compressed-air starting system. The fuel tank is installed in the fuselage and has a capacity of 88 gallons.

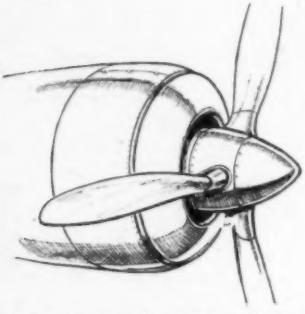
Four fixed guns are fitted, two in the fuselage and two in the wing. The fuselage guns are Browning-F.N.s of 7.9 mm. calibre each, firing at the rate of 1,300 rounds a minute. The wing guns are of the same manufacture but of 13.2 mm. bore and with a rate of fire of 1,000 rounds a minute. For these guns a special explosive bullet has been introduced. This explodes 8 seconds after being fired. An interesting development noted in the fuselage is the circular cartridge conveyer.

The D.23 has not yet been flown and no performance figures are being issued, though a figure of about 330 m.p.h. was being commonly quoted.

In spite of its advanced design the new Fokker can hardly be such a formidable weapon as the Hurricane and Spitfire shown nearby on the Hawker-Siddeley and Royal Air Force stand respectively. The Hurricane which, at 6,000 lb., weighs 600 lb. more than the Supermarine, has a three-bladed De Havilland variable-pitch airscrew and ejector exhausts and is good for at least 335 m.p.h. when carrying its eight machine guns.

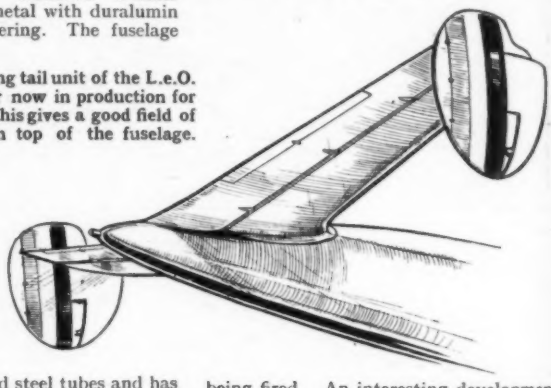
Despite its seclusion, the Spitfire is attracting its due share of admirers. The version shown has a fixed-pitch airscrew though later machines will have a v.p. type. A detailed description appears in this issue.

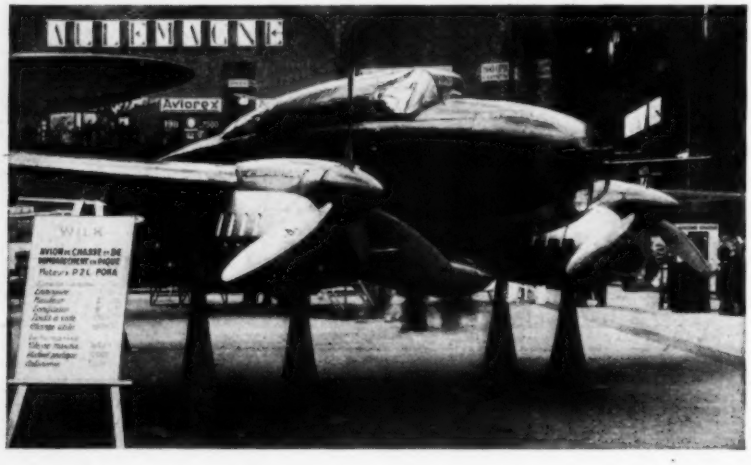
The Supermarine's speed being at least 355 m.p.h. one marvels at the audacious



On the right is the striking tail unit of the L.e.O. 46 twin-engined bomber now in production for the French Air Force. This gives a good field of fire for the shell-gun on top of the fuselage.

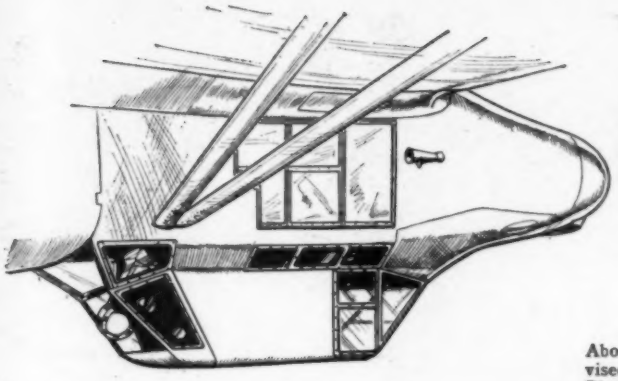
(Left) The new Mercier cowling for radial engines is seen for the first time installed on the L.e.O. 46. The cooling air escapes through an annular slot round the nose.



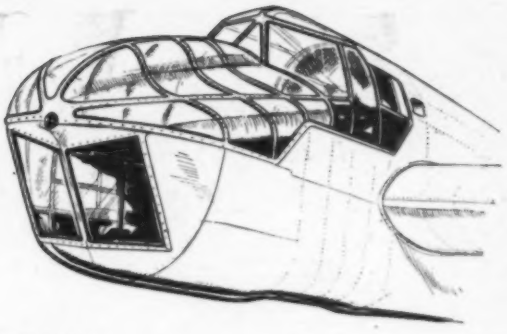


This view shows the grouping of a shell gun and two machine guns in the nose of the P.Z.L. Wolf two-seater fighter. The cowling of the "hush-hush" inverted-vee engines may also be studied.

THE PARIS SHOW (CONTINUED)



Above is seen a close-up of the observer's compartment below the fuselage of the general-purpose twin-engined Hanriot, the French designation of which is *avion de travaille.*



Above is the revised nose of the Blenheim which facilitates bomb-aiming and navigation, apart from slightly improving performance.

placard on the Koolhoven stand which claims that the F.K.58 single-seater fighter is "*le plus rapide du monde.*" This is the machine that Koolhoven has been demonstrating to the French Government. As a result of tests at Villacoublay and Cazaux a production order may be placed for a quantity. Arranged as a low-mid-wing monoplane, the F.K.58 has a cantilever wooden wing with two box spars and plywood covering. The fuselage is of welded steel tubing, covered partly with duralumin and partly with fabric. The undercarriage retracts inwards; the wheels when raised are housed in the fuselage, specially shaped fairing panels attached to the oleo legs completing the fuselage lines.

Three examples have so far been built, all with the Hispano Suiza 14AA two-row radial of 1,080 h.p. The Bristol Mercury VIII is specified as an alternative, but it is intended eventually to fit the Bristol Taurus.

Under each wing is a large bulge housing two pneumatically operated Browning-F.N. machine guns mounted on their sides. A thousand rounds of ammunition are provided for each gun. One gathers that all four guns can be dismounted by four men in two minutes.

A top speed figure of 312 m.p.h. is quoted for the Hispano-engined version, the estimated figure for the Taurus-powered machine being somewhat higher due to the better cowling lines. Those of the present version are far from ideal because the Hispano radial is a direct-drive type and of comparatively large diameter. Actually, the cowling at present has flat sides.

A useful feature which is not demonstrated is the quick detachability of the side fairing panels in the vicinity of the cockpit.

On official diving tests the machine is claimed to have reached 540-550 m.p.h.

The Morane 406 is an *avion strictement de série*; in other words it is a standard production type taken straight off the production line. The engine is the Hispano Suiza 12Y31 with a shell-gun firing through the airscrew boss. There are in addition two wing-mounted machine guns. A notable feature is the marked splaying out of the undercarriage wheels.

This Morane is France's counterpart of the Hurricane but the performance is not so high nor the armament so heavy.

A rather later type also ordered for the *Armée de l'Air* is the Bloch 151, a sturdy looking all-metal low-wing job with a very closely cowled Gnome Rhône 14N. This machine can be equipped with any of the following armament loads: 4 M.A.C. machine guns in the wings with 500 rounds each; 2 H.-S. 404 shell guns with 60 shells apiece; 2 shell guns and 2 machine guns. The prototype with Gnome Rhône 14N11 does 304 m.p.h., but a later version—the Bloch

The ejector type exhaust manifold on the Rolls-Royce Merlin II of the Hawker Hurricane.

152 with 14N21 engine—is said to be good for 320 m.p.h. One of these Blochs has been selected for the installation of a Pratt and Whitney Twin Wasp, which engine has been adopted by the French Air Ministry.

Like all the new French fighters the Bloch is designed for rapidity of series construction.

The peerless Supermarine Spitfire tucked away in a corner of the Air Ministry's stand. This fighter has eight guns and a performance superior to that of anything in the show.

An even more recent type is the C.A.O. 200, which looks like a development of the Nieuport 161. The estimated speed of 340 m.p.h. (for the present version with Hispano 12Y) can be believed, for the machine is small and very clean though the under-surface of the deep fuselage is somewhat angular. Radiators are apparently installed in the wings. Slotted flaps are specified and the wings are very heavily tapered and have an unusually sharp dihedral. The climb to 19,600ft. is said to take only 7½ minutes.

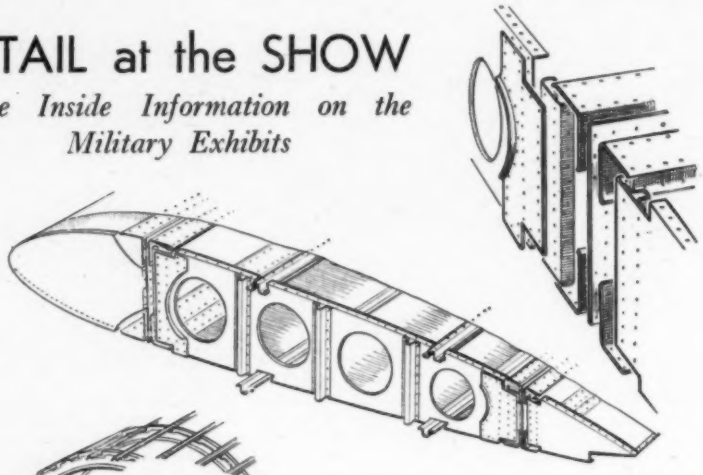
The Avia concern is prevented through political unrest from showing its type 35 fighter. Judging from the model it looks very much like a Spitfire; it has a fixed-pitch wooden airscrew and a fixed undercarriage. The top speed is just over 300 m.p.h.

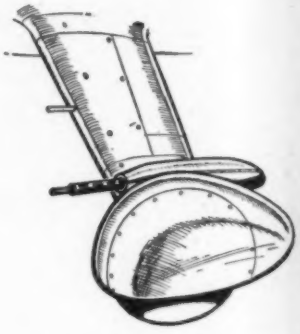
The sole survivor of the crop of light fighters produced two years ago seems to be the Caudron, with an inverted-vee Renault of 450 h.p. This is very much like a scaled-up Coupe Deutsch machine and has a shell-gun in each wing. Top speed is about 290 m.p.h. at 13,100 ft., but with its extremely rapid acceleration the machine could soon reach well over 400 m.p.h. in a shallow dive.

The latest twin-engined fighter exhibited is the diminutive Polish P.Z.L. *Wilk, Loup,* or Wolf with two secret P.Z.L.-Foka air-cooled inverted vee-eights of unspecified power. On first sight these might easily be taken for 240 h.p. Argus, but one is assured that the power is very much higher. The airscrews are electrically variable Ratiers. Grouped in the nose of the fuselage are

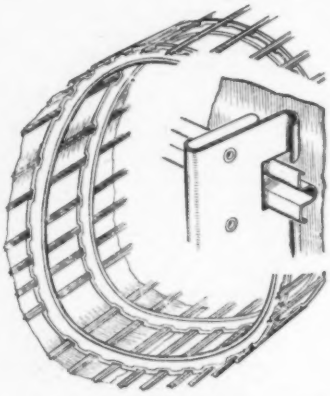
DETAIL at the SHOW

Some Inside Information on the Military Exhibits

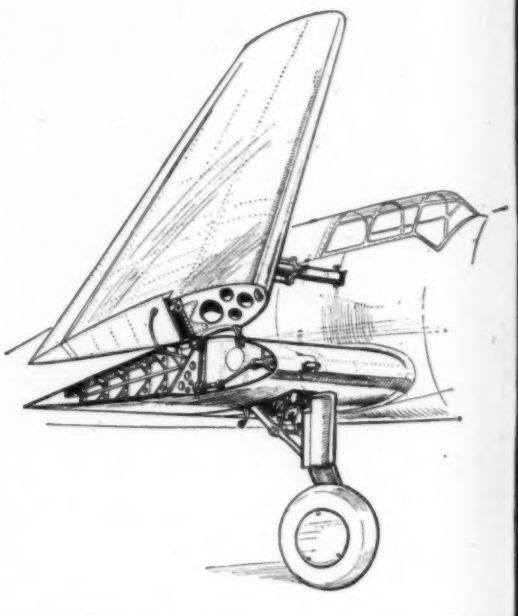




One of the fixed guns in the undercarriage of the P.Z.L. Gull army co-operation monoplane. This machine follows Lysander practice in many respects.

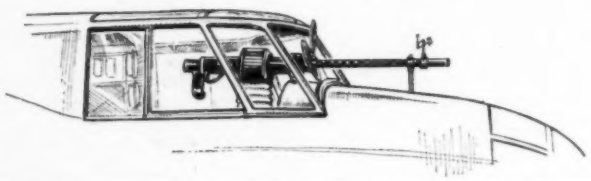


Features of the wing and fuselage construction of the long-nosed Bristol Blenheim. Actually the structure differs little from that of the short-nosed version.



On the right is a comprehensive view of the wing-folding and undercarriage arrangements of the Vought dive bomber. Note the jury strut between the wing and fuselage.

On the Dornier Do.17 bomber (below) a forward-firing gun protrudes through the pilot's windscreen.



a 20 mm. shell-gun, two machine guns, a landing light and the pitot head. There are two machine guns in the rear cockpit.

Unlike the little twin-engined P.Z.L. trainer the *Wolf* is of all-metal construction. It has been ordered in quantities by the Polish Air Force to replace the single-engined gull-wing P.XI and P.XXIV machines. The top speed, at 285 m.p.h., is comparatively low, but development work may improve it.

Beneath the fuselage is a 660 lb. bomb which can be handled by the *Wolf* when functioning as a dive bomber. The twin-engined arrangement apparently obviates the use of bomb displacement gear.

In view of the heavy wing loading the *Wolf* looks a bit of a handful, though its manufacturers have a reputation for building very sound flying machines.

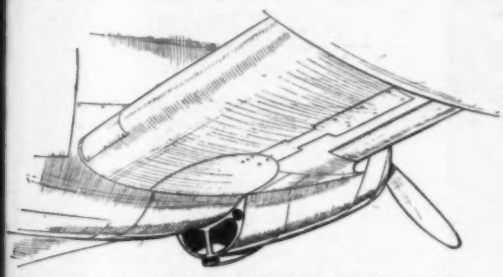
The S.A.B.C.A. S.47 two-seater fighter looks fast and practical and is, in fact, very reminiscent of our Fairey P.4/34. It appears in very effective camouflage and is powered with a Hispano Suiza 12 Ycrs engine fitted with a shell-gun. In the wings are two 7.7 mm. machine guns and there is a third weapon of this type in the rear cockpit. The S.47 can be used alternatively as a reconnaissance machine or for ground attack by day or night. A bomb load of 440 lb. can be accommodated.

One gathered that the wing has a single torsion box spar. The fuselage is a straightforward welded structure with covering of light alloy and fabric. The wheels twist through 90 deg. during retraction. It seems that the machine has already made one or two short flights. The estimated speed at 13,800 ft. is 298 m.p.h., the stalling speed 71 m.p.h., and the climb to 19,680ft., with fighter load, 11 min. 40 sec. Cruising at 217 m.p.h., duration is two hours

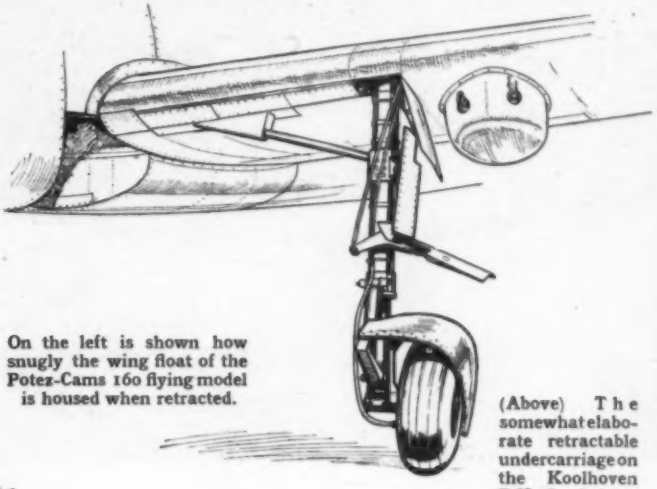
The production version of the Potez 63 is on show but seems to differ little from the prototype shown two years ago, though the engines are small-diameter Gnome-Rhône 14M., whereas the prototype had Hispanos. Actually the machine is in production with both types of power plant, the Gnome-Rhône-engined type doing 290 m.p.h., or about 5 m.p.h. more than the Hispano powered model.

Series production is well under way and a useful number of machines has already been delivered to squadrons.

Hanging from the ceiling and so not available for close inspection is the Galtier 30 low-wing fighter monoplane, the first product of the Arsenal at Villacoublay. It looks a beautiful little job and the prototype has already done a fair amount of flying, enough, in fact, to prove that it is faster than the standard Morane, though one gathers that the engine is the Hispano X of only 690 h.p. The G.30 appears to have slotted flaps. Armament comprises one engine-mounted shell-gun and two small-bore machine guns in the wing. The undercarriage folds inwardly á la Hurricane. A tunnel-

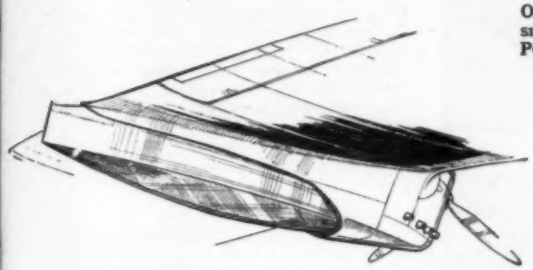


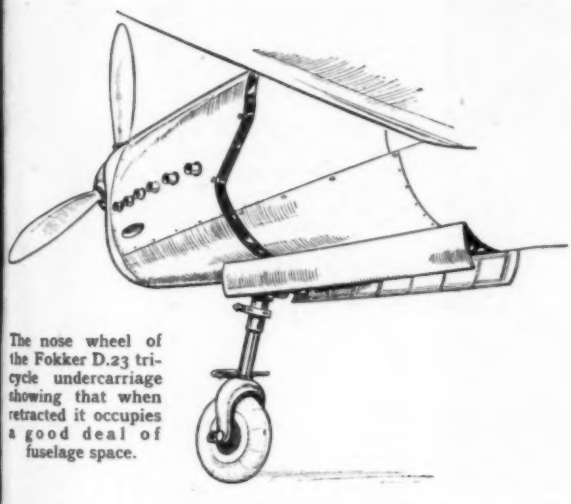
The cooling air for the rear Walter Sagitta on the Fokker D.23 is admitted through this scoop.



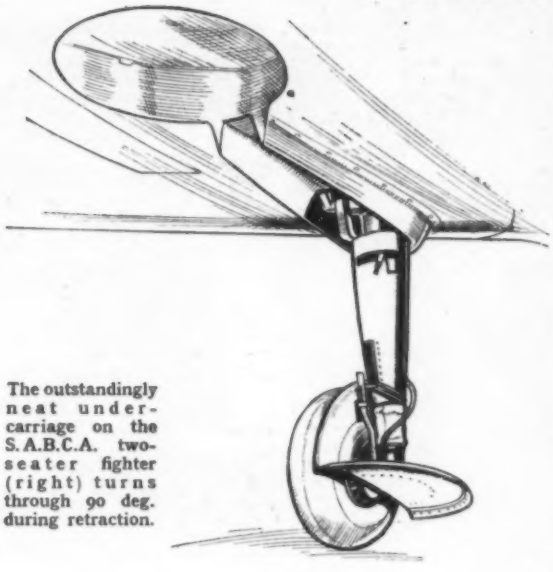
On the left is shown how snugly the wing float of the Potez-Cams 160 flying model is housed when retracted.

(Above) The somewhat elaborate retractable undercarriage on the Koolhoven F.K.58 fighter. The gun fairings are also visible.





The nose wheel of the Fokker D.23 tricycle undercarriage showing that when retracted it occupies a good deal of fuselage space.



The outstandingly neat undercarriage on the S.A.B.C.A. two-seater fighter (right) turns through 90 deg. during retraction.

type radiator is set well back under the fuselage.

The prototype of the new Dewoitine D.520 (S.N.C.A.-Midi) is required for test and cannot be shown. Models and pictures indicate that it is a shapely low-wing monoplane with Hispano Y engine and wing radiators. The design has been planned for very rapid production *en grande série*.

There is a model of the Bréguet 690 twin-engined fighter-bomber which is now in production for the French Air Force. This has two small-diameter Gnome Rhônes and an estimated speed of 310 m.p.h. It seems to be rather roomier than competitive types and the armament is well distributed.

Bombers and General-Purpose Types

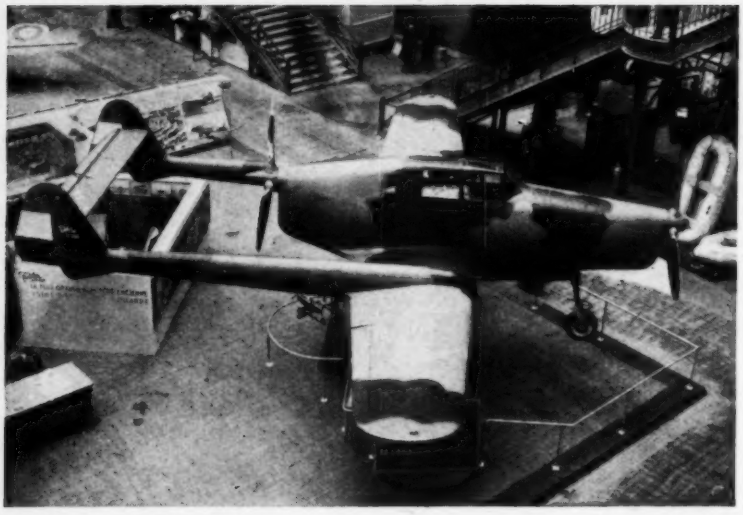
UNFORTUNATELY the long-nosed Bristol Blenheim and the Dornier Do.17 are at opposite ends of the Salon, so direct comparison is difficult. Both these machines are very fast twin-engined bombers carrying a crew of three.

The long-nosed Blenheim appears in the unsullied silver of its stressed skin. Little internal equipment is evident, but it can be seen that the new nose-piece will make things much easier for navigation and bomb-aiming. Aesthetically, the new nasal arrangement leaves a good deal to be desired, though actually it slightly improves performance, the top speed being 295 m.p.h. with Mercury VIIIs. These engines, as already announced, are now available with 100-octane fuel for take-off, permitting a heavier load of petrol (87 octane for cruising) and a range of 1,900 miles. The machine shown has Rotol airscrews whereas those supplied to the R.A.F. are De Havillands.

The Dornier Do.17 appears with two radials which may be B.M.W.s or Bramo Fafnirs. The performance with these motors is probably inferior to that of the Blenheim, though it is claimed that the version with the latest Daimler-Benz liquid-cooled inverted-vees does well over 300 m.p.h. A batch of Do.17s was supplied to Yugoslavia with two-row Gnome-Rhône engines. These machines, operating alongside Blenheims of the short-nosed type, have shown themselves to be many kilometres on hour slower. Japan has also acquired a number of Dorniers.

Curiously enough the Do.17 is described on the Dornier stand as a fighter, though it actually accommodates a heavier bomb load than the Blenheim. The pilot has a forward-firing gun, the barrel of which protrudes through a slot in the windscreen; there is a second gun on top of the fuselage and a third firing downward through the floor.

Figures issued on the stand show a maximum load of 6,600 lb., a service ceiling of 29,500ft.; a top speed of 310 m.p.h.; a landing speed of 68 m.p.h.; and a maximum range of 1,550 miles.



A view showing the layout of Fokker's new D. 23 single-seater twin-engined fighter, powered with two Walter Sagitta inverted vees.

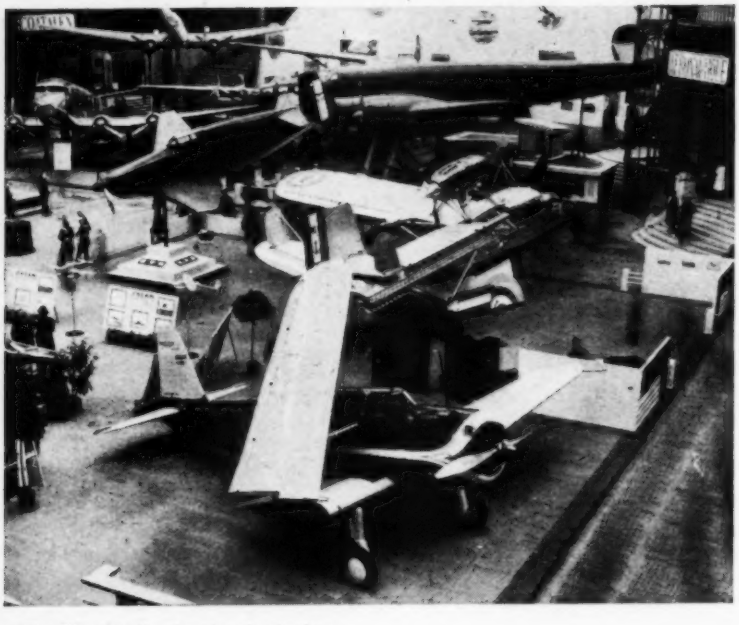
THE PARIS SHOW (CONTINUED)

which is derived from the record-breaking 370 and resembles the Gnome-Rhône-powered 340, which is said to have made quite an impression on the staff of the German Air Force when it carried General Vuillemin on his official visit to Germany. The Paris-Berlin trip was made at an average speed of 273 m.p.h. As was to be expected, the production-type bombers will have an extraneous enclosure for the pilot's head to facilitate formation flying; Rossi's machine, of course, has a fuselage of practically perfect lines.

Poland's reply to machines of this type is the P.Z.L. Elan, which is in large-scale production for the Polish Government. The version shown has Polish-built Pegasus XXs installed in somewhat peculiar N.A.C.A. cowlings, which rapidly diminish in diameter. Another unorthodox feature is the four-wheeled undercarriage, which is not evident at the Salon, being retracted into the nacelles and completely covered by fairings.

A neat stabiliser on the tricycle undercarriage leg of the Fokker D. 23, to check wheel shimmy

The monoplane wing is an extraordinarily low aspect ratio and makes the fuselage appear very short, though it is, in fact, of excellent shape. The nose portion has a good deal of transparency and carries a gun with a limited arc of fire. Two other guns are fitted farther aft. Large cells in the fuselage and wing will accommodate a load of about 5,680 lb. of bombs, though with this load the range is only about 800 miles.

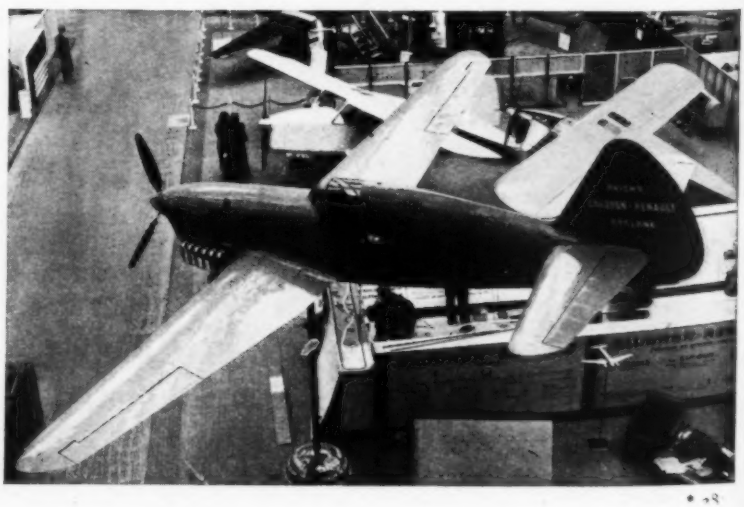


The Vought dive bomber in the foreground (above) is designed for carrier operation and so has folding wings.

The type of engine which gives these results is not named.

One of the more regrettable features of the show is the occupation of the Amiot (S.E.C.M.) stand by a small model of Rossi's record-breaking Hispano-powered monoplane instead of an example of the new Amiot bombers now being built for the French Air Force. These new bombers resemble in essentials the record breaker and the original long-range mail-carrier which were so outstanding among the exhibits at the previous Salon.

The particular model destined for issue to French bomber squadrons is the 350,

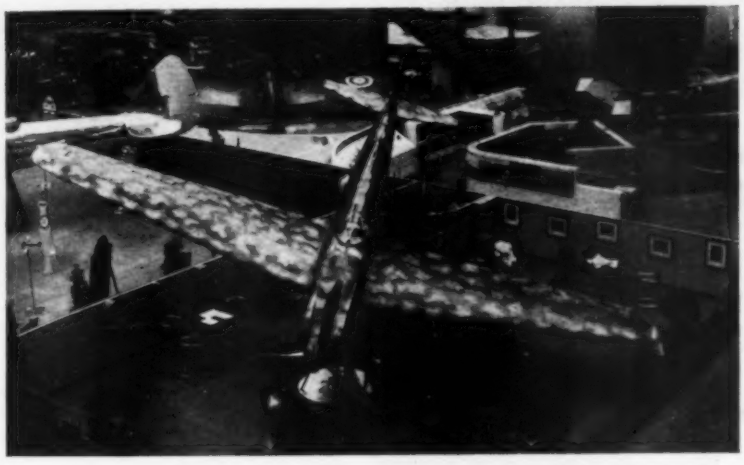


Caudron's light single-seater fighter which has two shell-guns and an inverted-vee Renault engine. *Coupe Deutsch* influence is apparent.

Actually the projectile load for a range of 1,365 miles is 3,880 lb.

As the latest development of their successful, though far from beautiful, single-engined bomber-reconnaissance machine, P.Z.L. are showing the Silure. This, likewise, has a Polish-built Pegasus with archaic-looking exhaust pipes leading back over the wing. The gilled cowling is interesting because the top and bottom sections of the ring of gills are replaced by fixed fairing panels so that there is a clean sweep from the nose back to the fuselage.

There is a long line of bomb cells which are said to hold 1,300 lb. of bombs. Aft of these is a commodious retractable housing for bomb aiming and the use of a downward-firing gun. As an attack machine the Silure carries six machine guns. The tail has twin fins and rudders, and the undercarriage is of fixed



(Above) a view of the P.Z.L. Mouette (Gull) army co-operation machine showing its resemblance to the Westland Lysander, even to the guns in the undercarriage.

trousered design. The top speed with Pegasus XX is surprisingly high at 260 m.p.h.; it is almost unbelievable that the substitution of a Gnome-Rhône 14 N raises the figure to 292 m.p.h.

The most eyeable of the bombers is the Lioré 45, the prototype of which has been flying for some time. This is a low-mid-wing design with a very sharp dihedral on the tail plane, which carries twin fins and rudders, the fins being attached at their upper ends. The metal structure has been designed with a view to the installation of engines to give a top speed of 320 m.p.h.; the prototype has already been dived up to 385 m.p.h. One believes that the ultimate engines will be Gnome-Rhône P-14s of 1,200 h.p. each. The armament installation is outstandingly interesting for a machines of this type, the top rearward-firing gun being a flexibly mounted Hispano shell-gun. There is retractable machine gun position under the fuselage and a fixed gun for the pilot. Nose turrets seem to be out of fashion.

An outstanding technical innovation is the fitting of the new Mercier engine cowling which gives exceptionally low drag. The cooling air has an annular exit round the front of the cowling in which the engine is almost completely enclosed.

Typifying the larger bombers now in development is the four-engined Marcel Bloch 162 B.5 with Hispano Suiza 14AA two-row radials of 1,100 h.p. each. The span is about 92ft. Two alternative bomb loads are available; equipped for heavy work, the machine will carry 256 bombs of 10 kilogrammes; 64 of 50 kilogrammes, 24 of 100 kilogrammes, 16

The graceful Belgian S.A.B.C.A. monoplane which is designed primarily as a two-seater fighter but which can also function as a fast observation or light bombing type.

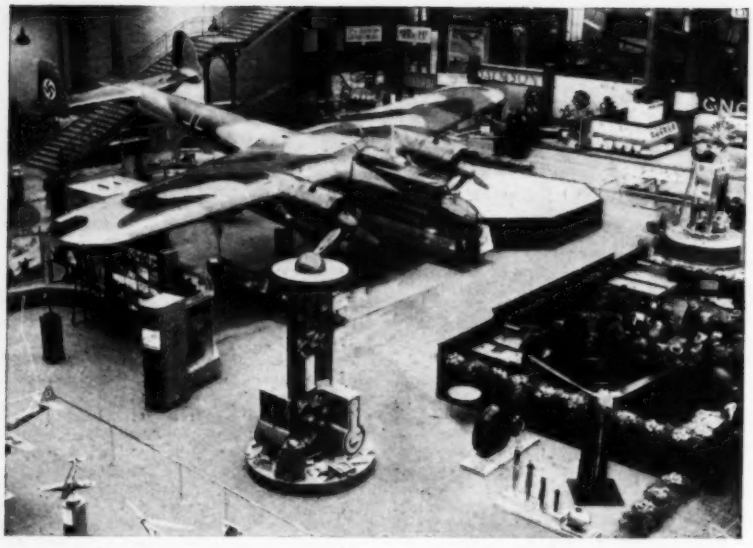
(Below) The production type Potez twin-engined fighter-bomber suspended over the flying scale model of the Potez-C.A.M.S. six-engined transatlantic flying boat.

of 200 kilogrammes or 4 of 500 kilogrammes. In the nose is an M.A.C. 7.5 mm. machine gun; on top of the fuselage is provision for a high-velocity Hispano 20 mm. shell-gun; and below is a second machine gun and another shell-gun. The estimated maximum speed is about 300 m.p.h.; the ceiling, 29,500ft., and the range, with a comparatively light bomb load (e.g., three 500 kilogramme bombs), 1,392 miles. A smaller type—the 135—B4 has four small-diameter Gnome-Rhônes and is estimated to do 310 m.p.h.

It is to be regretted that Marcel Bloch is not showing the new 174 twin-engined light bomber which does over 310 m.p.h. and is under development for the equipment of French squadrons.

Interesting in that it typifies the new French classification of *avion de travaille* (i.e., general-purpose machines which can operate from advanced aerodromes for reconnaissance or bombing work or, alternatively, be used for the training of pilots on twin-engined types) is the N.C.510T.3. This is an Hanriot design and is planned as a high-mid-wing monoplane with two small-diameter Gnome-Rhônes, a fixed undercarriage

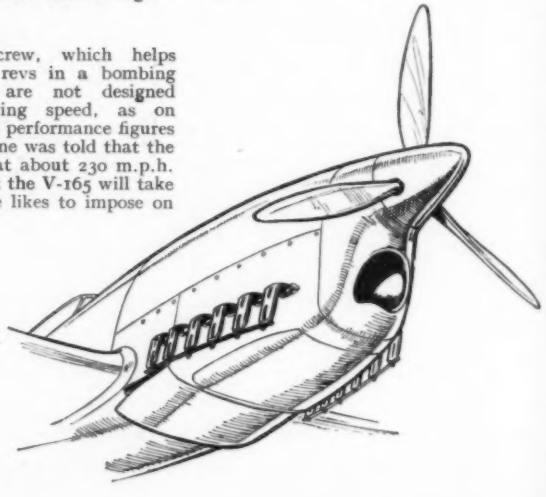
(Left) The front of the Koolhoven F.K. 58 single-seater fighter, showing the unusual cowling over the two-row Hispano and the bulges beneath the wings for the four Browning guns.



A section of the German "territory," showing the Dornier Do. 17 with its two Bramo Fafnir radials and its distinctive camouflage.

and a special transparent compartment under the fuselage to facilitate observation. The machine is comparatively slow (one of the penalties in "g.p." designs), the top speed being less than 220 m.p.h. It may be recalled that the specialised Hanriot twin-engined fighter with the same engines is claimed to do well over 300 m.p.h.

Likewise of particular interest (because it is the counterpart of our Blackburn Skua, which is represented by a model) is the American Vought V-156, which, for shipboard use, has folding wings. The President, on his official round of the stands, took a great interest in the wing-folding arrangements, showing himself to be a man of extensive technical knowledge. The V-156 is the export version of the SB2U-1 scout dive-bomber, now widely used by the U.S. Navy. It is designed for dive bombing with a 500- or 1,000-lb. bomb which is carried under the fuselage and provided with a special displacement gear to ensure that the falling projectile clears the airscrew. The construction is of fairly orthodox composite type, the wing having one strong tubular spar. The Pratt and Whitney Twin Wasp Junior engine is fitted with a constant-speed airscrew, which helps to keep down the revs in a bombing dive. The flaps are not designed to retard the diving speed, as on our Skua. Complete performance figures are not issued, but one was told that the machine will cruise at about 230 m.p.h. It is emphasised that the V-165 will take all the "G" anyone likes to impose on it.

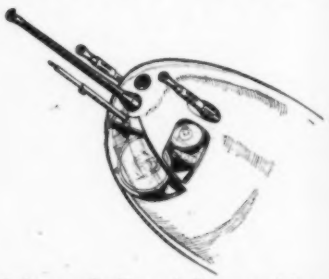


The nose of the Caudron light fighter (450 h.p. inverted-vee Renault) showing the Bronzavia flame-dampers.

THE PARIS SHOW (CONTINUED)

Miscellaneous Military Types and Trainers

THERE is usually one French exhibit which appears, on the face of things, to surpass all its predecessors in crudity of design. This year it is the Loire 130 single-engined pusher flying boat designed for catapulting from naval vessels and for colonial operation. Actually, this machine is being greatly misjudged because it is a type which, for a year or two now, has been giving very useful service and which was designed more for comfort and practicability under arduous conditions than for performance. It is, in effect, the counterpart of our Supermarine Walrus and is fitted with a single Hispano Suiza Series X engine. It would seem impossible to add any more excrescences, but, nevertheless, the manufacturers claim a top speed of about 140 m.p.h.



A dummy Oerlikon shell-gun and two wooden Brownings protrude from the nose of the P.Z.L. Wolf twin-engined light fighter. Note the landing lights.

The larger and more modern French military flying boats are represented by a large-scale model of the Breguet 730 and the Potez-C.A.M.S. 141. The proto-

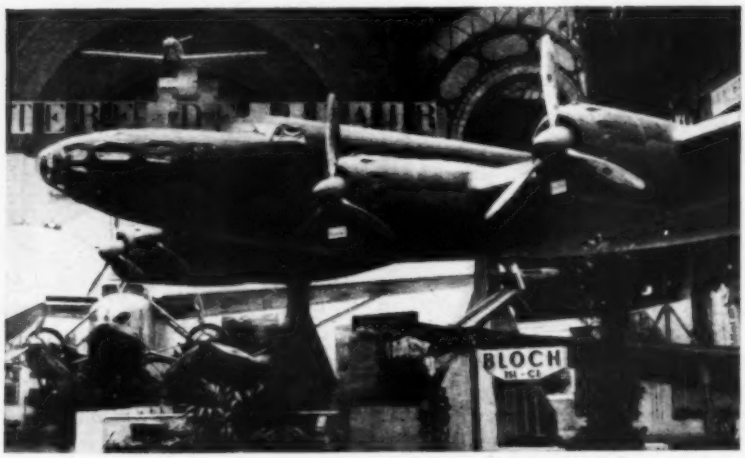
type of the Breguet was unfortunately wrecked on the rocks some time back. Like the Potez, it may be regarded as an opposite number of our Sunderland, but, unlike the former machine, has Gnome Rhône radials instead of liquid-cooled Hispanos. An interesting feature, apart from the formation of the upper part of the hull, which is reminiscent of the promenade deck of a liner, is the fairing of the wing-tip floats.

The Potez military boat is providing a lot of useful data for the construction of much larger transatlantic machines. A duration of 25 hours is claimed.

The modern formula for twin-engined military trainers is represented by the Hanriot 232 with two inverted six-in-line 200 h.p. Renaults and the P.Z.L. Braque. The Hanriot has been ordered in quantity to train French pilots to fly advanced military types and has a top speed of about 200 m.p.h. In layout it resembles the larger *avion de travaille* previously mentioned and, for that matter, the high-speed twin-engined Hanriot fighter. The structure is of metal, with fabric covering.

Resembling externally the new P.Z.L. twin-engined fighter, the Polish trainer is actually very different. Unlike the fighter, it is of wooden construction. In place of the highly boosted inverted-vees

A portion of the P.Z.L. stand with the Wolf light twin-engined fighter in the foreground and the Elan twin-engined bomber. The sharp tapering of the cowlings on the Elan are noteworthy.



The mock-up of the new Bloch 162 B.5 four-engined bomber with Hispano 14-cylinder two-row radials. Armament includes two shell-guns.

significant that the little Caudron single-seater trainer shown at the last Salon has not been put into production.

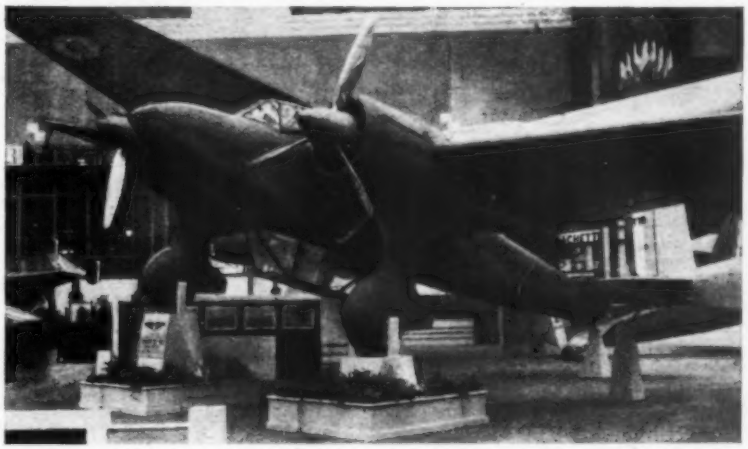
An example of a modern army co-operation machine which indirectly reflects great credit on a British manufacturer is the Polish P.Z.L. Mouette (Gull), which is obviously inspired by the Westland Lysander. The Mouette follows Westland practice even to the fixed guns in the cantilever undercarriage. The fixed-pitch airscrew on the small-diameter Gnome Rhône 14M is probably explained by the fact that the Mouette is designed to operate from advanced landing grounds with the minimum of complication and consequently maintenance. The top speed, at 223 m.p.h., is rather inferior to that of the Mercury-powered Lysander, but, nevertheless, the machine has been deemed useful enough to be ordered in quantity for the Polish Air Force.

(*Civil types are reviewed on pages* 505-507.)

it has two four-in-line units of 130 h.p. each. For bombing training it is provided with racks for two 27-lb. bombs. A fixed machine gun or a camera gun are other items of alternative equipment. The top speed of 195 m.p.h. is creditable in view of the low power and all-round utility of the type. The more cynical are expressing the opinion that if a pupil can handle the Braque he is competent to fly the most ambitious Continental prototypes.

On the S.N.C.A.S.E. stand is an old friend—the Romano R.82 biplane trainer as developed for the French Navy. Of unpretentious appearance, it is obviously very strong and tractable.

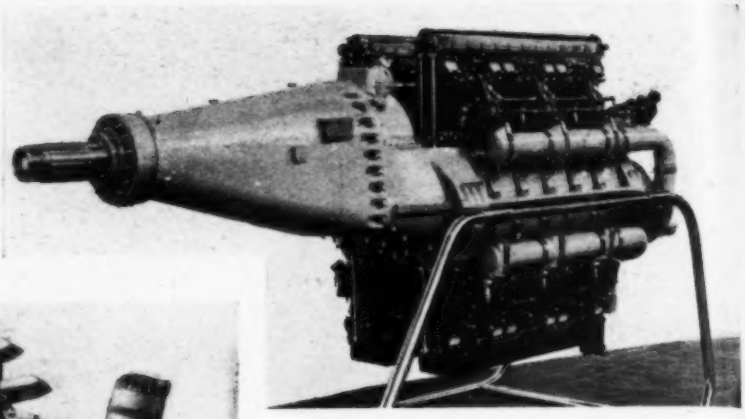
The light fighter-trainer (so far unknown to this country) is represented by a model of a little Lignel with a 220 h.p. Renault and a retractable undercarriage. It is considered on the Continent that machines of this type might be useful in the transition of fighter-pilots from more elementary aircraft. Something useful on these lines might be developed from a Percival Mew Gull, though it may be

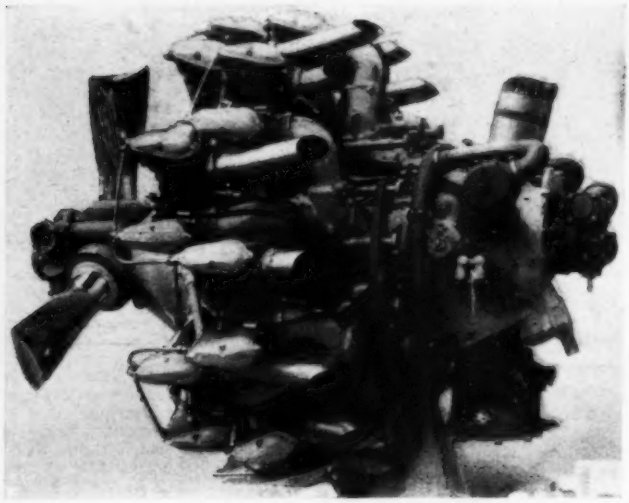


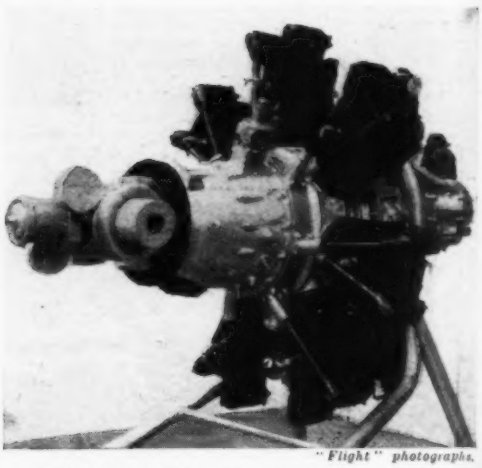
The business end of the Hanriot N.C. 510 P.3 *avion de travaille*. View for observation is considered so important that there is a special compartment below the fuselage.

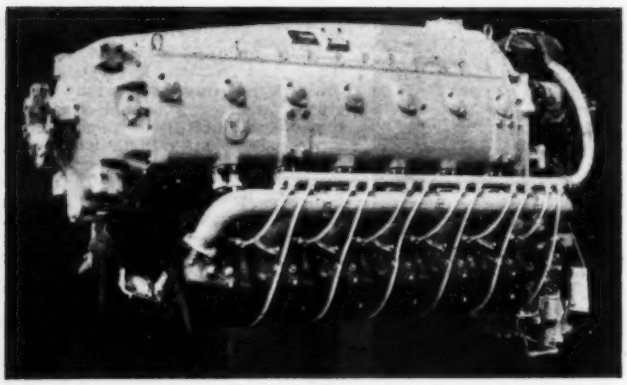
POWER in PARIS

A Brief Preliminary Review of the High Lights









"Flight" photographs.

At the top is the big new 2,000 h.p. Hispano Suiza with extension shaft; the upper of the left-hand views shows the new Gnome Rhône with two-speed supercharger; above, is the attractive new short-stroke Siddeley Cheetah XI, and the lower left-hand photograph shows the shapely inverted vee-twelve Argus. Photographs of new Bristol and Rolls-Royce units appear elsewhere.

FOR those who are seeking novelty of design the main attraction among the engine exhibits at this year's Salon is undoubtedly the big twenty-four-cylinder liquid-cooled Hispano intended for installation in the wings of giant trans-Atlantic flying boats. The cylinders are arranged in H formation and there are two superchargers and *twelve* carburetters. The engine is shown with a long extension shaft, but without concentric airscrews. The type 90 differs from the 82 in that it has provision for only one airscrew.

Of more immediate interest to aircraft designers are such engines as the latest Rolls-Royce Merlins, which are available for use with 100-octane fuel; the small-diameter two-row Bristol Taurus sleeve-valve unit; and the Napier Dagger VIII.

Details are being announced of the Merlin VIII medium-supercharged type which, on 100-octane fuel, gives 1,265 h.p. at 9,500ft. and 1,300 h.p. for take-off. On the same fuel the two-speed supercharged Merlin X gives 1,145 h.p. at 16,750ft.

Among the smaller air-cooled types (from diminutive inverted four-in-lines to inverted vee-twelves, Great Britain certainly seems to be holding her own, though as yet a fully supercharged version of the Gipsy Twelve (to compete with the Walter Sagittas as installed in the Fokker D.23 single-seater fighter) has not yet been announced.

A delightful surprise is the Siddeley Cheetah XI, which has new cylinders with a shorter stroke than previous models and runs at a higher speed, giving 460 h.p. for take-off. This is a very marked increase over previous models of the Cheetah and should be particularly beneficial for advanced training aircraft.

Three-speed superchargers are in evidence for the first time, a 12Y Hispano equipped with such a device having a rated altitude of 32,800ft.

Direct injection is not apparent on the Daimler Benz and Junkers inverted-vee liquid-cooled types, but a variation of the German method figures on the Lorraine stand.

Since the last Salon a good deal of money has been spent on the development of power units for ultra-light aircraft. These are generally of the four-in-line type, though radials are well represented.

Next week the Engine Exhibits will be reviewed and illustrated in detail.

HERE and THERE

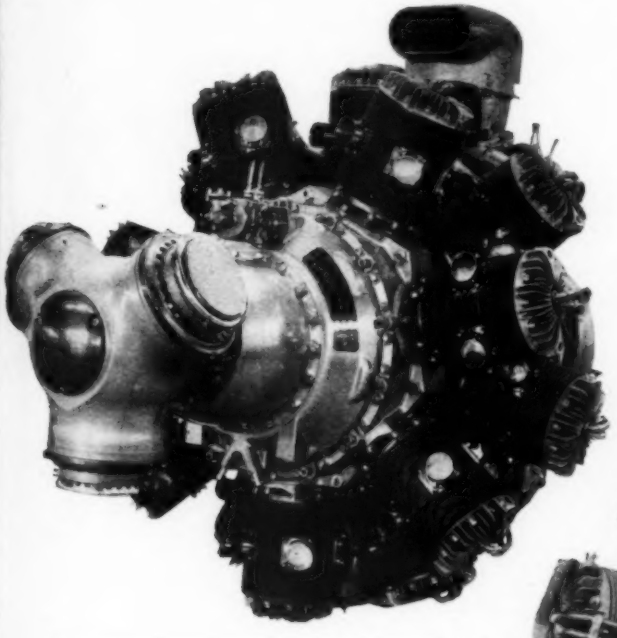
New Bristol and Rolls-Royce Engines : Douglas Factory for Australia? : French and German Developments

General Knowledge

THE modern airline pilot is expected to know a good deal which is not included in the syllabus for the Second Class Navigators' Certificate. A contributor to the B.A.L.P.A. Journal gives a long list of the sort of questions which are asked by passengers. We have picked out some of them:—

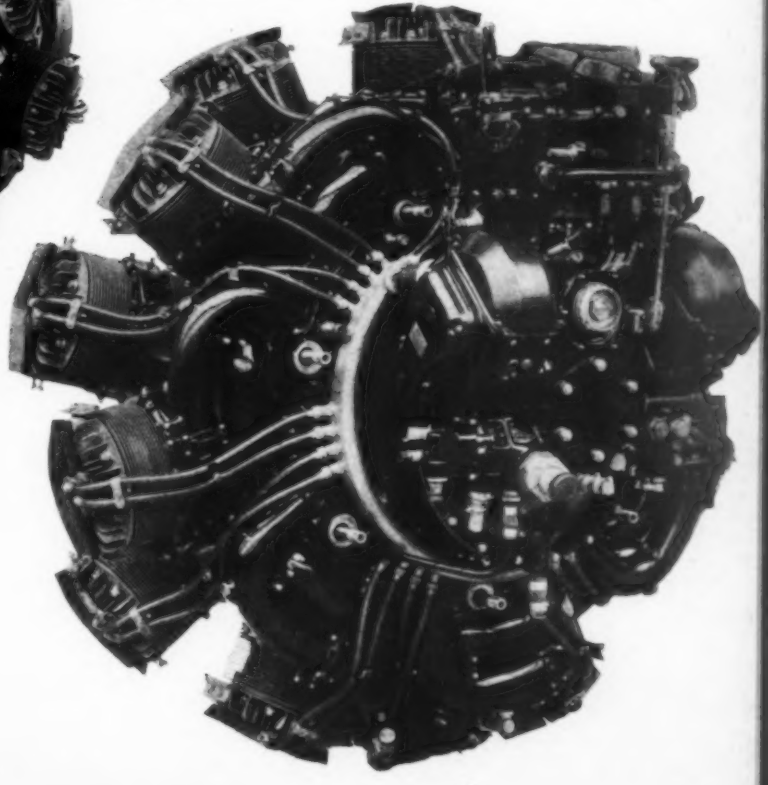
Can we get a bath at Juba?
Where is the best seat?
Do you take it in turns to fly?
Can you keep up on one engine?
How far away are we from Abyssinia?
Does your wife mind you flying?
Where do we see elephants?
Have you a radio?
Is it quite right for the wings to bend so much?
Is the waiter a Persian?
Can we go for a swim here?
When do we see the Arch of Ctesiphon?
I suppose you are not allowed to drop the mails overboard?
Do you have to put up two flags?
Don't you carry parachutes?

TANDEM SESQUIPLANE is perhaps the best description of this projected French Payen Fléchair single-seater fighter, which will have two 100 h.p. Salmson engines driving concentric airscrews. There is one main landing wheel under the fuselage and auxiliary skids at the tips of the "tailplane." The maximum speed at sea level on only 200 h.p. is estimated to be 285 m.p.h. and the landing speed 50 m.p.h.



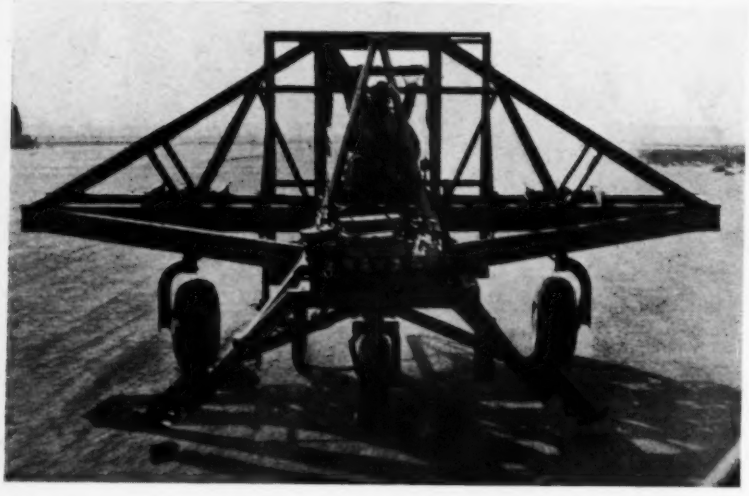
Under-Secretary's Private Secretary

CAPTAIN H. H. BALFOUR, M.C., M.P., Parliamentary Under-Secretary of State for Air, has appointed Mr. N. V. Meeres to be his private secretary in succession to Mr. F. R. Howard.



A NOT-SO-MYTHICAL BULL has been scored by the Bristol Company with the new Taurus two-row sleeve-valve engine of over 1,000 h.p. This unit, which is being exhibited for the first time at the Paris Show, is only 46½in. in diameter. A medium-supercharged version has completed a 100-hour endurance test and 50-hour flight testing and is now undergoing extensive overload tests. A fully supercharged model has also done its 100-hour endurance test and will shortly be fitted in a Bristol low-wing monoplane for a 200-hour reliability test. Crankshaft speeds are as high as 3,300 r.p.m.

HERE AND THERE (CONTINUED)



TRICYCLE TEST-RIG : Reminiscent of the strange vehicles evolved by Hollywood's camera technicians, this is the undercarriage-testing equipment referred to in a recent paragraph (p. 448, November 17). The Vega Aeroplane Company, a Lockheed subsidiary, uses it to test undercarriage legs and wheels under different loads and through various turning arcs. It is towed by a motor vehicle and then cast loose.

FIGHTER DEVELOPMENT : (Below) A unique series of photographs showing the development of a Curtiss pursuit design. Top is the standard P.36-A (Pratt and Whitney Twin Wasp radial) as supplied to the U.S. Army Air Corps ; second is a development with the liquid-cooled Allison vee-twelve with turbo-blower (note that the pilot has been moved aft to preserve the c.g. position) ; and third is a later model with revised accommodation and engine installation.

Douglas Factory for Australia ?

DOUGLAS and Northrop machines—both military and civil—may before long be assembled in Australia, if a proposal now before the Commonwealth Government is accepted.

An agreement has just been concluded between Councillor T. S. Nettlefold, of the Melbourne City Council, and Mr. Donald Douglas, president of the Douglas Aircraft Company, Inc., for the formation of the Douglas Aircraft Company of Australia, but the agreement has yet to receive Federal approval.

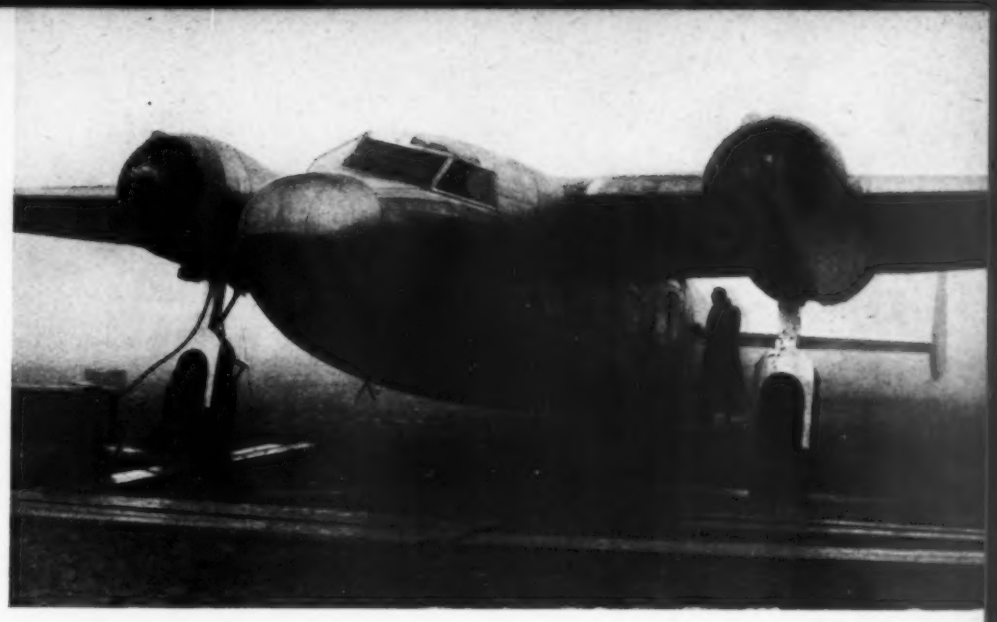
The agreement provides for the erection of an assembly plant in Sydney, Melbourne or Hobart, and for the export of some of the machines assembled to India, New Zealand and New Guinea. It is suggested that key workers should be brought over from the U.S.A., but that the remainder of the workmen should be Australians. It is said that the works could be turning out machines within twelve months of the date of approval.

Some time ago a similar proposal was made to the Federal Government by the Douglas Company through Mr. Harold Gatty, the New Zealand representative of Pan-American Airways, but no agreement was reached. Instead, Lockheed 14s were ordered, following a similar step taken by the British Government. The proposal, as it stood, required that an order should be placed for forty Douglas machines.

Still Lloyd's

ALTHOUGH the Joint Aviation Advisory Committee of Lloyd's Register and the British Corporation Register has been officially dissolved consequent on the formation of the Air Registration Board, the annual report of Lloyd's Register explains that the Committee continues to carry out certain duties in connection with the survey and inspection of aircraft.

During the past year an increasing number of these services have been made on behalf of underwriters and other interested parties, and the world-wide Lloyd's organisation has naturally proved of great value



OUT OF THE NEST: The D.H. 95, or Flamingo, comes into the open for engine running tests. These are the first photographs to be taken of the actual machine out of doors. Almost entirely of metal construction planned for quick production, the 95 has two Bristol Perseus XIIC sleeve-valve engines of 850 h.p. each. As the photographs show, the machine is of unusually clean and sturdy appearance, and the passengers should have a first-class view

HERE and THERE (contd.)

A German Air-cooled Vee-twelve

THE oldest German aero engine factory—that of the Argus Company—has produced Germany's first geared and supercharged air-cooled inverted-vee twelve-cylinder engine. The unit has lately passed its official 200-hours type test.

The design of the new engine has been developed from that of the inverted vee-eight engine known as the As.10. Of 60-deg. vee layout, the engine has an Elektron crankcase and cylinder liners of forged steel with screwed-on heads of aluminium alloy. The combustion chambers are of spherical shape and the cylinder heads are so designed that they are cooled obliquely by the air stream. Each cylinder has two radially disposed valves operated by push-rods from two camshafts located in the crankcase. Inlet valve seats, valve guides and sparking plug seats are of bronze and the seats for the exhaust valves of steel. The whole valve mechanism is entirely enclosed.

The forged steel crankshaft has counterweights and runs in seven lead-bronze-steel bearings. The aluminium alloy pistons have three compression rings and one scraper.

A notable feature of the engine is the Argus-Hobson carburetter with automatic boost control. Other items of standard equipment are a Junkers dual fuel pump with automatic pressure governor and a Bosch twin magneto. Lubrication is on the dry sump principle with feed assured by a pressure pump and two suction pumps.

The supercharger is a centrifugal type with spring drive and the reduction gear is of the planetary variety.

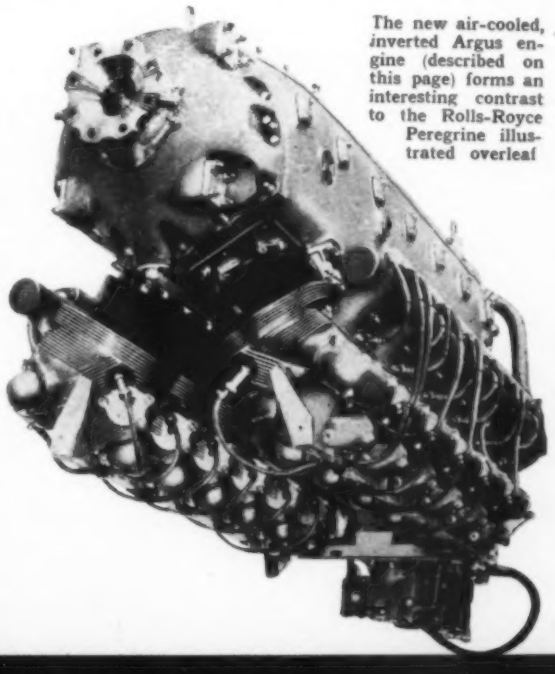
All accessories are located on the rear of the crankcase; these include an inertia starter, generator drive, hydraulic pump, air compressor and machine gun control.

Characteristics of the engine are: Bore, 105mm.; stroke, 115mm.; swept volume, 12 litres; compression ratio, 6.4:1; reduction gear ratio, 0.66:1; cruising power at sea level, 300 h.p. at 2,820 r.p.m.; cruising power at 9,850, 320 h.p. at 2,820 r.p.m.; maximum power at sea level, and at 9,850ft., 360 h.p. at 3,000 r.p.m.; take-off power, 450 h.p. at 3,250 r.p.m.; dry weight, 660 lb.; output per litre, 37.5 h.p.; overall length, 1,595mm.; width, 655mm.; height, 875mm.

Comprehensive Diary

WHAT must surely be one of the most comprehensive pocket diaries ever published has been produced by Wm. Collins, Sons and Co., Ltd., under the title of *Collins' Aero Diary*. It is designed to be of use to aircraft constructors, engineers, operators and pilots, and it contains over 200 different tabular and/or illustrated features. A few titles of reference pages picked at random will serve to show how wide is the scope: Adiabatic Compression and Efficiency, Aluminium Stresses, B.A. Threads, Compass Error, International Aircraft Markings, Aircraft Lights, Reynolds' Numbers, Great Circle Navigation, Trigonometrical Formulæ, Radio Call Signs.

There are, of course, all the usual diary features in addition Prices are 1s. 9d. to 7s. 6d., according to binding, from book sellers or from Collins', at 144, Cathedral Street, Glasgow.



The new air-cooled, inverted Argus engine (described on this page) forms an interesting contrast to the Rolls-Royce Peregrine illustrated overleaf

HERE AND THERE (CONTINUED)

The Lafayette Squadron

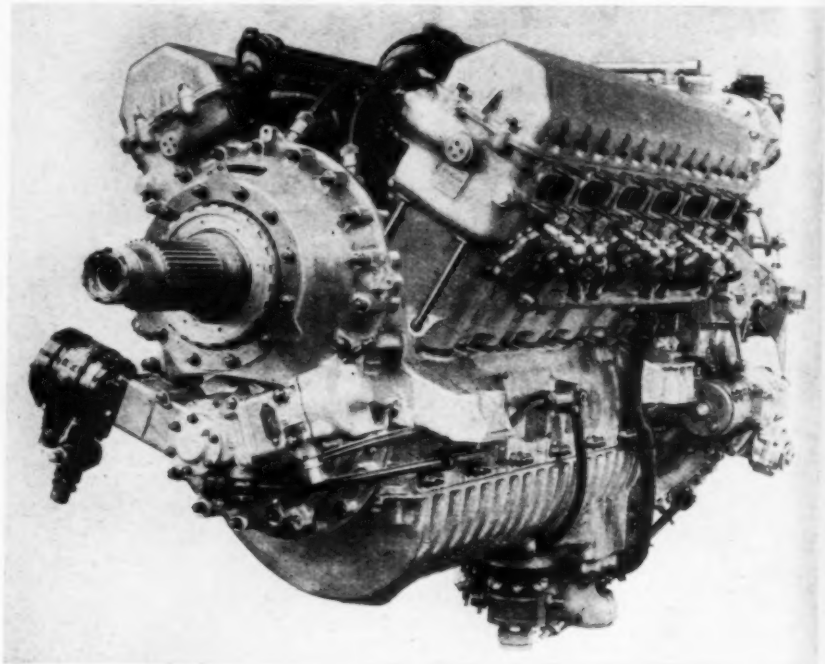
Flight into Hell: The Story of the Lafayette Escadrille. By Edwin C. Parsons. (John Long, 8s. 6d.)

THE Lafayette Escadrille was a squadron of the French Army Air Service during the Great War. It was composed of American volunteer pilots. The C.O. and second-in-command were French officers, and the mechanics were French. The squadron served in the French Army from April, 1916, to February, 1918, when it was taken over by the American Army, and for practical purposes lost its peculiar individuality.

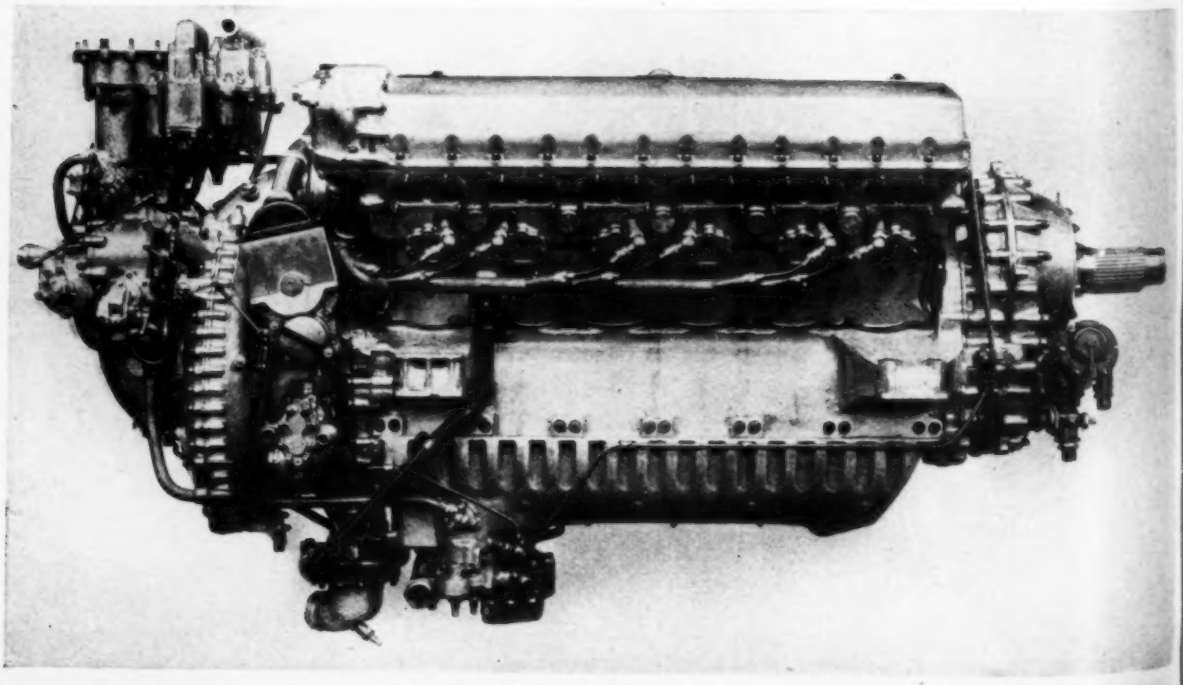
During its service in the French Army thirty-eight American pilots were, from first to last, on its active roster. Of these, nine were killed, one invalided out with wounds, and one taken prisoner. During the same period the squadron scored fifty-seven officially confirmed victories, though doubtless many more German machines were shot down too far behind the enemy lines for official confirmation to be possible.

If these figures seem small compared with the bag of No. 56 Squadron (for example), which arrived in France in April, 1917, and between that date and the Armistice shot down 427 enemy aircraft (officially confirmed), it should be remembered that the crack British squadron had had many more pilots on its books from first to last, and that its forty-four dead alone outnumbered the total number of pilots who served in the Lafayette. Also, the rules for confirmation were rather stricter in the French than in the British Service.

This book is a breezily told history of the Lafayette Escadrille by one of the Americans who served in it. There are many thrilling stories of air combats, and also intimate pen-pictures of several of the more notable of its pilots. Best known is Raoul Lufbery, who was a fighter pilot of great skill and courage. The Americans seem to have had very crude ideas of discipline, but they fought hard. It was their ideal to repay to France some of the debt which America owed to the Marquis de Lefayette during their War of Independence, and in this they succeeded. This book is sure to be popular.



THE NEWEST ROLLS-ROYCE: First views of the Rolls-Royce Peregrine engine, which has the capacity of a Kestrel (21.3 litres) and is rated at 830/860 h.p. at 13,500ft. in its Mk. I and Mk. II forms. Maximum power figures have not yet been issued. It will be noted that this engine, unlike the Kestrel series, has a down-draught carburetter. It would make an admirable power plant for installation in high-speed twin-engined fighters or bombers.



ARK ROYAL

A Visit to the Navy's New Aircraft Carrier

By MAJOR F. A. de V. ROBERTSON, V.D.

H.M.S. ARK ROYAL.

HISTORY tells that when the Spanish Armada sailed into the Channel and the little English ships put out from Plymouth and began to harry it, the greatest cheek and the greatest pluck were displayed by a ship called the *Ark Raleigh*. It had been presented to the Queen by Sir Walter, but the Queen in accepting it changed the name to *Ark Royal*. That was the origin of the name in the Royal Navy. A second *Ark Royal* was used as a seaplane carrier at the Dardanelles in 1915, and she still exists, as a training ship, though her name has been changed to *Pegasus*. The third and greatest *Ark Royal* has just arrived at Portsmouth from Birkenhead, and has hoisted the flag of the Rear-Admiral (Aircraft Carriers). By permission of the Admiralty I went over this vessel on Wednesday, November 23.

This ship is remarkable, not only for her size (she displaces 22,000 tons light and 27,000 when in deep draught) but because she is the first ship to have been designed from the start as an aircraft carrier. All the others which the Navy has used in the war and since the war have been converted from cruiser or some other design. One therefore expected to see something worth seeing, and one was not disappointed.

Here it may be stated that the *Ark Royal* has three geared turbines producing some 100,000 h.p. She can make perhaps 31 or 32 knots. She is oil-fired and there is no coal on board except for the forge. Cooking is done by electricity.

From her position in Portsmouth docks it was not easy to get a clear view of the ship from outside, but as one approached one was very impressed by the height above one of the end of her flying deck. Our guide first took us up to this deck. For a mere landlubber the ascent was a bit of an ordeal. A wind which must have been well over 50 m.p.h. was blowing that morning, and the companion up which we were asked to climb led outward and upward from the hull of the ship. Stuffing my hat in my pocket, I choked down my qualms and set myself to "climb the steep ascent to heaven in travail, toil, and pain." It rather reminded me of the first time I was zoomed in an aeroplane. However, the second stage turned inward and I soon found myself on the expansive flying deck, safe for the time being, so long as the wind did not blow one overboard. It was certainly a job to stand up against it.

I have heard a Fleet Air Arm pilot say that it is easier to land on a deck than on an aerodrome, and certainly this deck looked very large as one walked along it. It may not look so vast from a few thousand feet up. In length it is just on 800 feet, and the width is 90 feet. Of course, there are arrester wires along it, eight of them, and wind screens can be erected when necessary. There were none of them up that morning. First we noticed the armament of the ship. In each corner of the flying deck there are two four-barrelled machine guns (Vickers, I believe) to deal with low-flying hostile aircraft. There are also to be six eight-barrelled pompoms, firing shells which will explode on grazing, but only four have as yet been mounted. They will have something to say to dive-bombers. The main armament of the ship consists of sixteen 4.5 guns in double mountings, which are capable of high-angle or low angle fire as required. They are mounted slightly below the level of the flying deck.

Towards the bow there are three lift wells, and the lifts are two-storied affairs. There is also a hatch for lowering a stretcher from the flying deck straight down into the sick bay. Farther forward are two runways of rails for a modified form of catapult, known as accelerators. The hangars below are on two decks.

There are several other devices on the flying deck which show evidence of careful design. The posts and chains which surround the lift wells can be lowered into grooves in a very neat way. All over the deck, it seemed, there are loud-speakers which can be raised or lowered to lie flush with the deck. The whole deck can be floodlit if necessary but it is more usual to outline it with boundary lights which protrude only just above the deck level. As on other carriers, there are two hinged cranes for raising boats (and crashes if need be) which lie horizontally outboard when flying is in progress.

Then we went into the "island" on the starboard side of the deck, and saw the met. office, and the air intelligence office where the Observers' Commander details their jobs to the aircraft crews and tabulates the information which they send in from the air; and also the compass platform (a very well ventilated spot) above which is the Admiral's bridge. The Wing Commander has his position on this platform and controls the flying-off and flying-on from there. Normally the ship is steered from that platform, but there are four positions on board from which she can be steered, and in action one of the positions below would be used.

It was a relief to find that one could get down from the flying deck by a less exposed companion, and in the main hangar we were not worried by the wind. It is a vast hall, but can be rapidly divided up into compartments by fireproof screens. There is also an arrangement for flooding each compartment with water from the roof. Feed pipes draw fuel and oil from the storage tanks down below, and the nozzles can be very

quickly attached to the tank of any machine in the hangar.

It is not yet possible to say how many aircraft will be carried in the *Ark Royal*—possibly fifty-five or sixty. The number finally decided upon will depend on various considerations, such as type and what the ship proves capable of working with efficiency. As for personnel, it is expected that the ship will have some 140 officers and a company of about 1,600. Of these about 350 may at first be R.A.F. airmen, but as naval ratings complete their training as air mechanics they will take the places of the R.A.F. men. Most of the pilots are likely to be naval officers from the start, and the first batch of rating pilots, whom I saw being trained at Leuchars in the spring, will probably join the ship's company.

An interesting feature of the carrier is the seaplane conversion store, where floats can be substituted for landing wheels if there should be need to use seaplanes for any reason.

We were shown over the rest of the ship, and two main impressions are left on my mind. One is the extreme consideration which has been shown for the health and comfort of all petty officers, N.C.O.s, seamen and airmen. The food looked and smelt absolutely first-class, and men who have to be late for meals find their rations kept warm for them in electric stoves. The recreation rooms for all ranks are most comfortable. The second impression left is going up and going down numberless companions, until one's head was in a whirl and one did not know on which deck one was or in which direction one was facing. I would rather be left alone in the Hampton Court maze than in the *Ark Royal* with no one to show me the way out. But if I were in the Fleet Air Arm there is certainly no carrier in which I should sooner go to sea.

THE ROYAL AERO CLUB

Official News and Notices for *Week Ended November 26*

'Ware Balloons

A LARGE increase in captive-balloon flying experiments in Europe has been notified during the past few weeks. Several leading air Powers have notified balloon flying areas, and, in some cases, heights mentioned are as much as 13,000ft.

Private aeroplane owners are well advised to make careful enquiries before approaching Augsburg, Bavaria, and Bulach, Switzerland, where experiments were in progress last week, and, in addition, the areas already mentioned in *The Air Pilot* and British *Notices to Airmen*.

Mooring cables are usually marked by red and white streamers by day and by groups of red and white lights by night, but there are occasions where cables will not be marked in districts notified as balloon danger areas.

New Certificates Record

THE record monthly number of Aviators' Certificates has been achieved. During the month just ended 170 new Certificates were issued by the Royal Aero Club, against 64 in the same month last year. This large total is attributable to the public support of the Civil Air Guard scheme.

Record Accepted

NOTICE has been received by the Royal Aero Club of the acceptance by the Fédération Aéronautique Internationale of the International seaplane record for distance in a straight line, established by the Short-Mayo float seaplane in October. The distance was 9,652.001 km. (5,997.5 statute miles), and the pilot and crew were: D. C. T. Bennett and I. Harvey. Other details were given in the Royal Aero Club news in *Flight* of November 10.

Prohibited Areas in Rumania

NOTICE was received by the Royal Aero Club on November 23 that Rumania has made extensive alterations in the positions of her prohibited areas, and in corridors for crossing frontiers.

A.—West Frontier.

(a) Prohibited area: A band of 5 km. from the Czechoslovak frontier as far as Satu Mare (exclusive) Arded-Simleul Silvaniei-Alsed, Holod, Ineu, Pancota-Sf. Ana-Macea-Hungarian frontier.

(b) The entrance corridor towards Arad bounded in the north by the southern boundary of the Macea-Sf. Ana-Pancota prohibited area; and in the south by C.F. Battonya-Pecica.

The entrance corridor of the frontier between Rumania and Hungary: 5 km. on both sides of the section of the Arad-Curtici-Bekescsaba railway line is open only for public transport aircraft of regular airlines.

(c) Frontier prohibited from Pecica to Baba Veche.

(d) Prohibited area of Resita bounded by the following localities: Jamul Mare-Bocsa Romana-Scaius-Rugi-Valiug-Bozovici-Sopotul Nou-Bazias-the Yugoslavian frontier between Bazias and Jamul Mare.

B.—South Frontier.

Entrance and exit corridors:—

(a) Ghidierd (21 km. S.E. of Calafat) bounded by the following localities: Piscul Nou-Ghidierd to the west and Coveiul-Negoiul to the East.

(b) Bechet bounded by the localities Comesteni-Balta Nedeia in the West and Ianca-Balta Potelu in the East.

(c) Giurgiu bounded in the West by Ghisdaru-Balta Maharul and in the East by Baneasa-Oinac.

(d) Bazargic between Arnaut Cuius-Alorman.

C.—Sea Coast.

Entrance and exit corridors:—

(a) Balcic between Take and Cavarna.

(b) Constantza between Lake Techirghiol and Sutghiol.

D.—East Frontier.

Entrance and exit corridors:—

(a) Cetatea Alba between Palanca and Black Sea.

(b) Tighina on the Nistre between Barnita and Ghitcani.

(c) Iarova (21 km. N.W. of Soroca) on the Nistre between Viscosa and Badiceni, towards Manastireni.

E.—Central Prohibited Area.

Teius - Sf. Gheorghe - Mixil - Targoviste - Deva - Zlatna, bounded by the localities Slatna-Teius-San Miclaus-Copsa Mica-Vanatori-Sf. Gheorghe-Mizil-Ploesti-Targoviste Spina-Pietrosul (1712) Muncelul Mare 1885-Toplita.

Corridor for crossing the central prohibited area bounded by: San Miclaus-Turnisor-Pietrosul (1712) in the West, Copsa Mica-Bradu-Spini in the East.

Air Touring

FRANCE.—Romilly-sur-Seine Aerodrome has been closed to public air traffic. Chateauroux-Deols Aerodrome has been opened.

GERMANY.—The blasting operations at Essen-Mulheim Aerodrome previously reported have now been discontinued.

TANGANYIKA.—A new aerodrome has been opened at Loliondo-Masai district.

Committees

THE Committee met on November 23. It had been preceded by meetings of the House, Finance and Rules Committees, which rendered their reports.

AVIATORS' CERTIFICATES

No.	Name.	School or Club.	Date.
16,558	John Frederick Garton	Tollerton	16.11.38
16,559	Ronald George Bowles	Cambridge	14.11.38
16,560	Kenneth William Owen	Hampshire	18.11.38
16,561	Leonard Blunn	Cardiff	18.11.38
16,562	George John Michael Hart ...	Northern Aviation ...	5.11.38
16,563	Henry Osburne Haughton... ...	Kent	30.10.38
16,564	Kenneth Edward Richardson Booth	Lancashire	13.11.38
16,565	John Haddon Carter	Eastbourne	24.10.38
16,566	Frederick Gordon Stewart... ...	Northern Aviation ...	14.11.38
16,567	John Herbert Perrin	York & Leeming ...	18.11.38
16,568	Dorothy Eileen Porter	Bournemouth	19.11.38
16,569	Frederick Charles Baggs	Portsmouth	21.11.38
16,570	Leslie Alexander William Smith ...	Southend	19.11.38
16,571	Hon. Lucy Falkiner	,, ...	14.11.38
16,572	Alan David Lintern	,, ...	21.11.38
16,573	Wilfred Henry Dumbrill	,, ...	18.11.38
16,574	William Henry Carr-Birkbeck ...	Yorkshire	22.11.38
16,575	Leslie John Morris	London Air Park ...	19.11.38
16,576	James Stanley Wallace	Newcastle-on-Tyne ...	18.11.38
16,577	George Herbert Guy Williams ...	Malling	11.11.38
16,578	Cecil Esmond Gurney	,, ...	10.11.38
16,579	Geoffrey Howard	,, ...	10.11.38
16,580	Douglas Walter Frederick Catt ...	Southend	21.11.38
16,581	Charles Lewis Lewis-Hall	London	17.11.38
16,582	Francis Harold Clark	Thanet	20.11.38
16,583	Robert Samuel Johnston	Portsmouth	5.11.38
16,584	Geoffrey Gates	Northern Aviation ...	21.11.38
16,585	John Rogers...	London Transport ...	15.11.38
16,586	Nancy Mary Williams	Misr Airwork, Egypt ...	17.11.38
16,587	Valerie Mindelsohn	London Air Park ...	22.11.38
16,588	Vincent John Day	,, ,, ...	23.11.38
16,589	Harold Marshall	,, ,, ...	21.11.38
16,590	Luis Joaquin Barreiro	Autogiro School ...	23.11.38

This "355 m.p.h.-plus," 1,000 h.p. eight-gun fighter has the air, in front elevation, of an ultra-light sports machine with flat-twin engine.

THE R.A.F.'S FASTEST FIGHTER

Features of the Vickers-Supermarine Spitfire Eight-gun Fighter Now Revealed : Over 355 m.p.h. : Easy Maintenance and High Performance : Rolls-Royce Merlin II Engine

IN these days it is a matter of extreme difficulty to ascertain which is the fastest military aircraft in the world in any particular category. It seems fairly certain, however, that the Vickers-Supermarine Spitfire eight-gun single-seater fighter, details of which have now been released, is the fastest standard fighting machine now on issue to any air force. In addition to the machines turned out by the Vickers-Supermarine works, a thousand examples have been ordered from the new factory now being erected by Lord Nuffield.

That the Spitfire incorporates the experience gained in the building of a series of Schneider Trophy winners is immediately apparent on external examination. The structure, of the all-metal stressed-skin type, has been developed by the Supermarine Company over a long period and is claimed to be very robust and exceptionally light. Ease of maintenance has been achieved in spite of the high performance characteristics. Complete interchangeability of components is another claim.

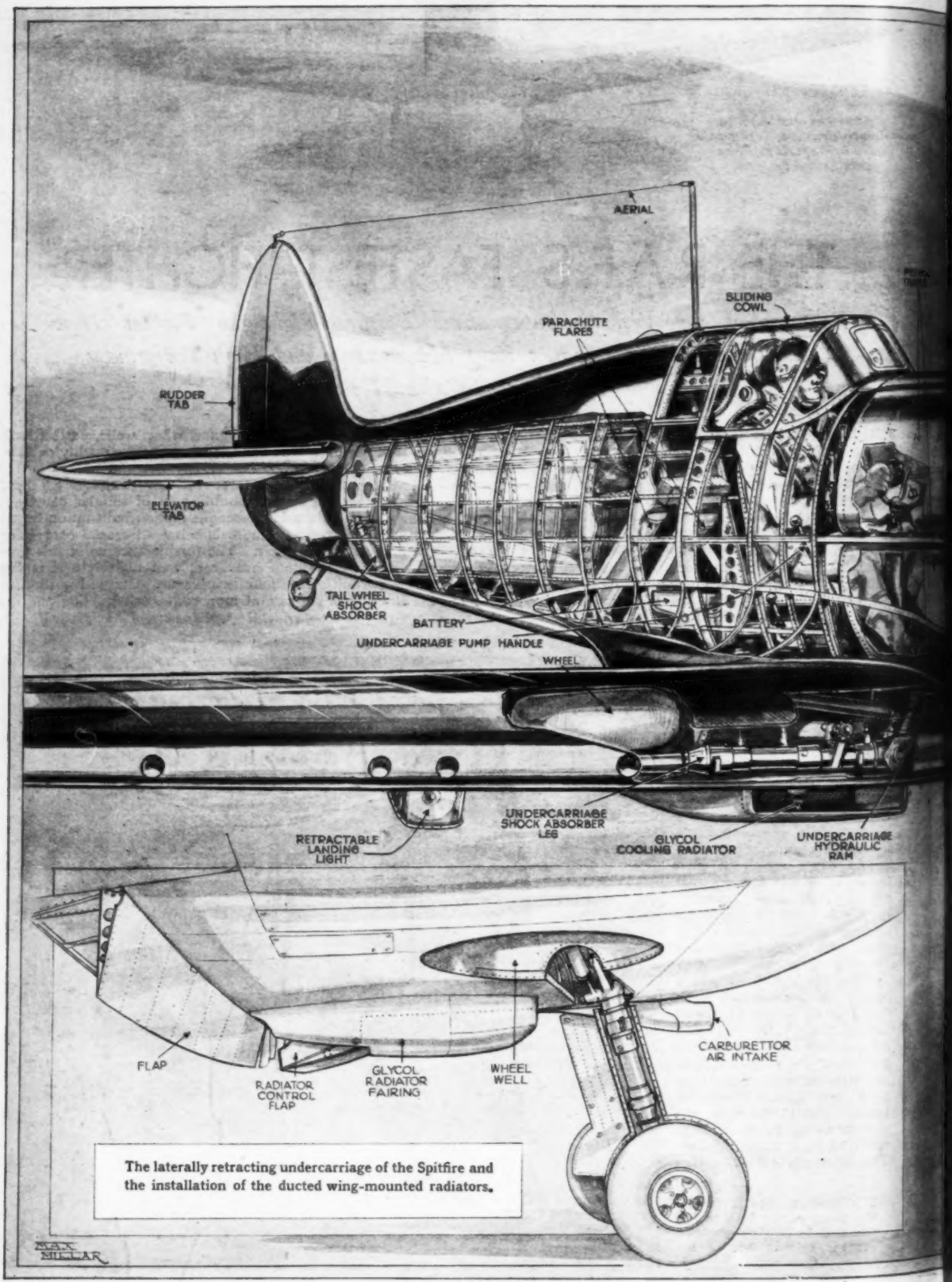
The wing, which in plan form is what the French would call the "insect" type, has a single spar comprising tubular flanges and a plate web. Forward of the spar the wing is covered with heavy-gauge Alclad which forms, in conjunction with the spar web, a stiff, strong torsion box. Besides giving an excellent form to the nose portion of the wing this type of construction has very good anti-flutter characteristics. Aft of the spar, the ribs are of light alloy and the covering of a thinner gauge. This section has doors giving access to the eight machine guns, wheel wells, etc. Riveting is of the flush type and the wing tips are readily detachable for replacement.

The fuselage is built in three sections. The forward part, which forms the engine mounting, is of tubular construction. Aft of this is a monocoque section built up on transverse frames, the longitudinals being intercostal except for the four main longerons. The foremost frame of this portion forms a fireproof bulkhead, and built into it is the centre portion of the main wing spar. The tail portion of the fuselage is likewise of monocoque construction and in-

(Continued after double-page drawing of the Spitfire.)

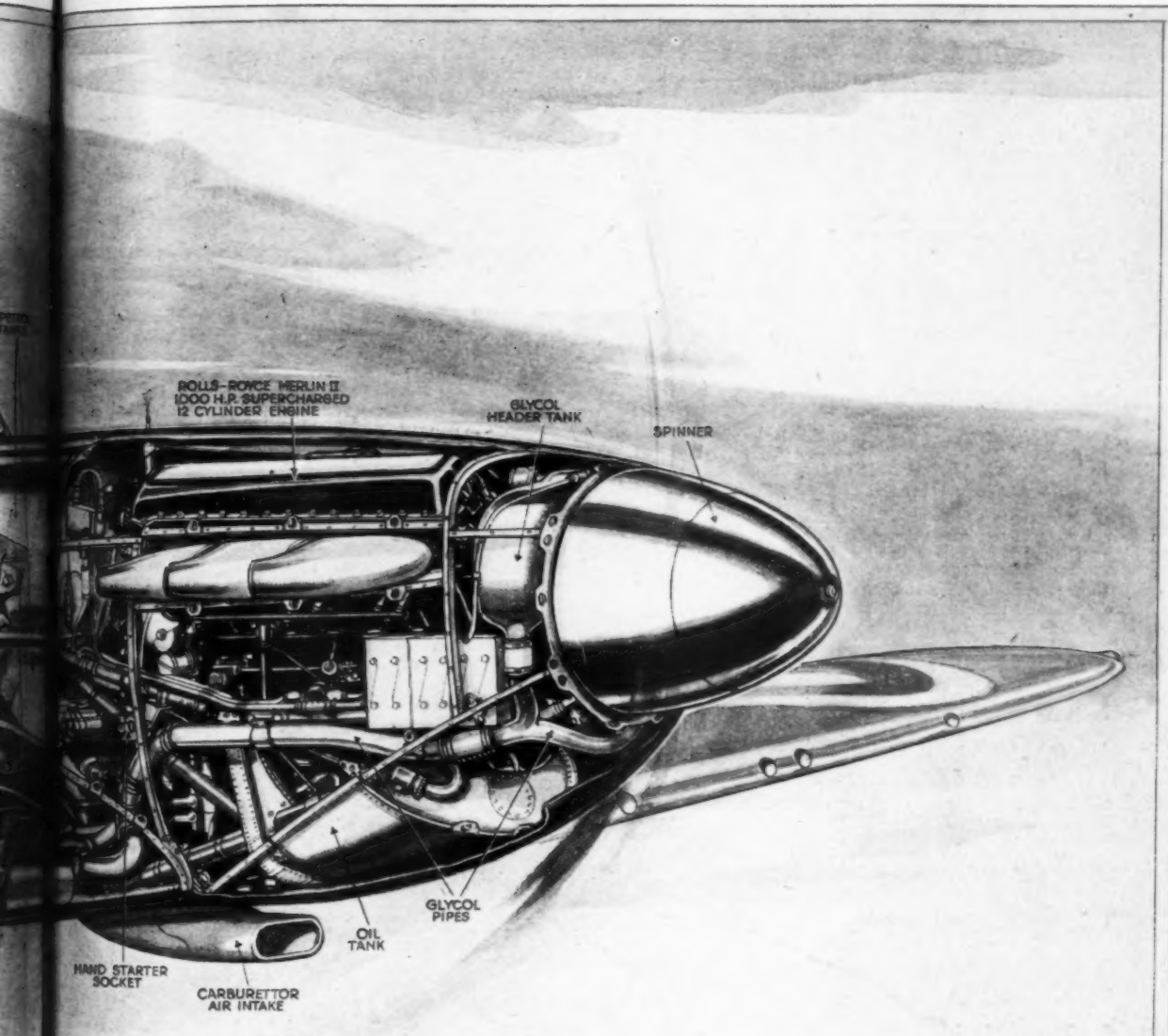
The beautiful plan form of the wings of the Spitfire is revealed as *Flight's* photographer catches her in a tight turn.

THE WORLD'S FASTEST STANDARD FIGHTE—



The laterally retracting undercarriage of the Spitfire and the installation of the ducted wing-mounted radiators.

—THE EIGHT-GUN SUPERMARINE SPITFIRE



The first internal exposition of the Supermarine Spitfire eight-gun single-seater fighter monoplane now being delivered in quantities to squadrons of the Metropolitan Air Force. The engine is the Rolls-Royce Merlin II, which gives a maximum output of 1,030 h.p. at 16,250ft. on the standard fuel of 87 octane number. Although the first Spitfires to be delivered are fitted with two-bladed wooden airscrews later machines will have a variable-pitch type, compensation for the extra weight of the v.p. version being made in the first machines by the weights seen mounted under the engine cowling. Despite its performance the Spitfire carries full day-and-night-fighter load, including wireless. A specially developed Spitfire is being supplied to the R.A.F. for high-speed research.

corporates the fin and carries the tailplane, elevator and rudder. This whole section is detachable.

The fin is of similar construction to the tail end of the fuselage; the tailplane has light-alloy ribs and is made in two halves attached by means of the spars to port and starboard side of the fuselage; the elevator is in one piece and is of light-alloy construction with fabric covering; and the rudder, which is mass-balanced, is also a fabric-covered light-alloy unit.

In comparison with the undercarriages of certain other modern military machines, that of the Spitfire is very simple. Each of the medium-pressure wheels is carried by a Vickers cantilever oleo-pneumatic shock-absorber leg mounted on a single robust spigot. The leg is extended to form a lever for the attachment of the hydraulic jack which is operated for retracting purposes by a quick-acting hand pump. Alternatively, an engine-driven pump can be fitted. An emergency device is provided, taking the form of a small cylinder of carbon-dioxide for lowering the wheels should the normal system fail. A positive lock is provided for both up and down positions and there are mechanical position indicators in addition to electrical signals. An electric horn gives warning when the throttle is closed with the undercarriage up. The tail-wheel is of the fully castering type.

Protection

Due to its comprehensive protective treatment, the Spitfire can be used from coastal aerodromes without fear of corrosion. A special chromate priming paint is used throughout, followed by aluminium-pigmented cellulose lacquer. All steel parts are protected in addition by electroplating with cadmium or spraying with aluminium.

A sliding roof is fitted to the pilot's cockpit and there is a hinged panel in the side of the fuselage for ease of entry and exit. The pilot's seat and his rudder pedals are adjustable, the seat being very quickly detachable for access to the cockpit interior. Equipment in the cockpit includes trimming-tab control for the elevator and rudder, a control on the joy-stick for the pneumatic wheel brakes (differential control is effected by the rudder pedals), flap control on the dashboard and a cockpit ventilator. Provision is made aft of the cockpit for wireless.

Eight Browning machine guns are mounted, four in each wing, being staggered for easy feeding and compactness. A camera gun may be fitted for training.

A 12-volt, 500-watt engine-driven generator is included and there is a 12-volt, 25-ampere/hour accumulator.

Behind the cockpit is provision for flares for emergency night landings. In this connection it is interesting to note that the prototype Spitfire was deliberately landed with the wheels up and flaps down. Only very slight damage was done to cowlings and fairings, the structure of the machine remaining quite intact with the exception of slight deformation of one rib supporting the radiator.

The engine of the Spitfire I is the fully supercharged Rolls-Royce Merlin II, rated at 990 h.p. at 2,600 r.p.m. and 12,000ft. The maximum output is 1,030 h.p. at 3,000 r.p.m. and 16,250ft. Large detachable cowling panels are provided. The coolant is ethylene glycol, cooled by a radiator mounted in a duct below the starboard wing.

Two fuel tanks, with a combined capacity of 85 gallons, are mounted in the fuselage aft of the fireproof bulkhead, feeding direct to the engine pump. In the event of pump failure the engine operates on gravity feed. Both tanks are quickly detachable and are of light-alloy construction with de Bergue riveting. A tinned-steel oil tank is mounted below the engine, its surface forming part of the fuselage contour. Honeycomb coolers are fitted under the starboard wing and are thermostatically controlled.

Electric starting is standard. Normally an external source of supply is used, but provision is made for an internal accumulator. Hand turning gear is also specified.

The exhaust manifolds are of the new Rolls-Royce ejector type. The first machines to be delivered to the R.A.F. have two-bladed wooden airscrews, but provision is made for the variable-pitch type.

Dimensions of the Spitfire are: Span, 36ft. 10in.; length (thrust line horizontal), 29ft. 11in.; height (airscrew vertical), 11ft. 5in.; wing area, 242 sq. ft. gross.

Complete performance figures are not available, but the top speed is certainly more than 355 m.p.h.

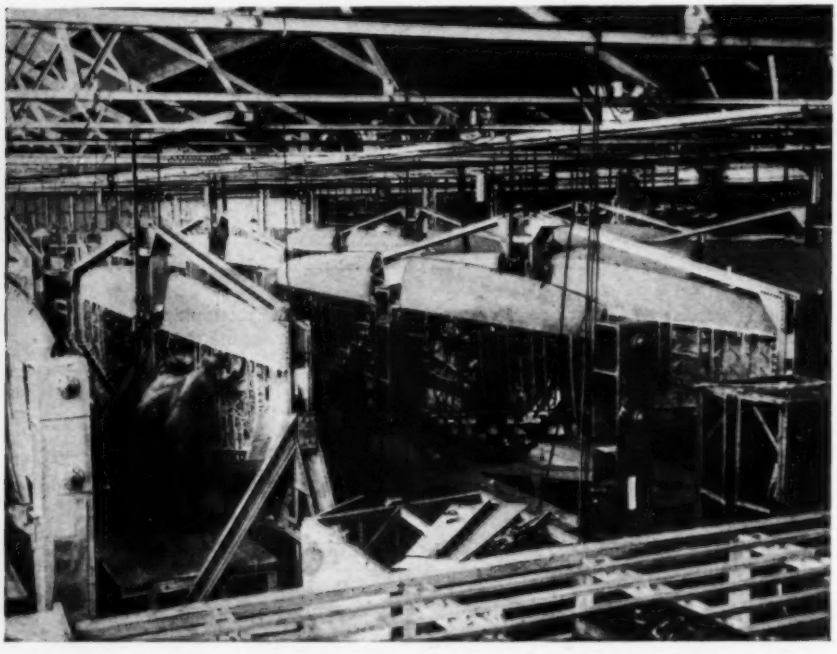
"Decentralised" building of a modern fighter such as the Spitfire is only made possible by close co-operation between the parent firm and sub-contractors.

Among those contributing to the Spitfire are General Aircraft, who are playing a very big part by producing mainplanes and tailplanes as well as a number of details. The photograph on this page gives some idea of the scale on which the work is being carried out. General Aircraft have not only produced all the tools for the details, and multiples of the assembly jigs, but also a comprehensive series of cross-reference gauges to ensure Service standards of interchangeability.

An associated firm of General Aircraft, Aero Engines, Ltd., are responsible for complete elevators and ailerons for the Spitfire, together with the necessary jigs and preparatory work.

Other contributors to the production of this notable fighter include:—

Pobjoy Airmotors and Aircraft, Ltd.; Cellon, Ltd.; The Airscrew Co., Ltd.; Heston Aircraft Co., Ltd.; Folland Aircraft, Ltd.; J. Samuel White and Co., Ltd.; Fletcher Bros.; Serck Radiators, Ltd.; G. Beaton and Son, Ltd.; Westland Aircraft, Ltd.; Excelsior Motor Radiator Co., Ltd.; W. and A. Williamson and Co., Ltd.; Singer Motors, Ltd.; Carbodies, Ltd.; Reynolds Tube Co., Ltd.; Dunlop Rubber Co., Ltd.; Bratt Colbran, Ltd.; The Pressed Steel Co., Ltd.; and Worcester Sheet Metal and Pressings Co.



Pairs of Spitfire wings on their jigs in one of the bays of General Aircraft, Ltd.

COMMERCIAL AVIATION

AMERICA'S BIGGEST : The Boeing 314, seen here alighting on Lake Washington, Seattle, after a test flight, has now completed its manufacturer's trials. This particular machine is the first of six being built for Pan-American Airways.

THE WEEK AT CROYDON

"A. Viator," in his Commentary on Transport Affairs, Discusses Imperial's New Machines, Emergency Airports, Black-Outs (Accidental) and Hangar Accommodation

IT never rains but it pours when people really begin to deliver aeroplanes to a long-suffering air transport company. No sooner had Sir John Reith made a remark to the effect that delivery had been a trifle slow than *Ensign* was joined at Croydon by *Euterpe, Enterprise, Elsinore* and *Egeria*.

Frobisher, too, hurried to Hatfield and returned flying in formation with the second of the D.H. machines, *Falcon*. The latter seems to be designed for the Brussels-Cologne-Frankfurt line, whereas *Ensign, Frobisher* and *Scylla* will, for the time being, keep the home fuel burning between London and Paris with one return journey each per day. Everything else with wings, including the local carrier pigeons with mail strapped to their legs, will be on the Empire mail business. Of these various aeroplanes the first of the Ensign class to fly along the new overland route to India is *Elsinore*, which left during the week-end.

One day last week Capt. J. T. Percy, with a total load of 2½ tons, including 17 passengers, flew *Frobisher* to Paris in 53 minutes—without the usual record-breaker's friend, a tail wind. This is three minutes faster than the previous commercial record, held by Air France.

Original Idea

On the Monday before last we had thick fog, and most services started from somewhere else. The K.L.M. evening service, which takes passengers to Amsterdam for the next day's Far East service, had to be operated from Lympne. I am told that the Air Ministry, which five or six years ago promised adequate alternative airports to Croydon and Heston, has suddenly circularised operating companies to know what they think of this new bright idea of having somewhere to go when the weather at the terminal is too bad. One imagines that the original idea has long since got into those files from which no document ever returns, and that this idea of ports of refuge is the brilliant creation of some gay young brain at Ariel House. They are great lads up there. There is a story going round of a correspondence about an erring pilot who flew over a danger area where artillery fire might be taking place. The correspondence ended, on the official side, with a remark somewhat as follows: "It will be appreciated that every effort should be made to obviate the possibility of an aircraft coming into contact with a projectile." One would never have thought of that, of course, without a hint from the good old Civil Service. But, anyway, these fast modern air liners would dodge behind the projectile, throttle back so as not to pass it and just follow along.

Great fun was had by all last week when, after a preliminary black-out on Monday, the airport lights all went out. I must say the authorities managed to keep some sort of landing lights going, but one pilot of a modern air liner more or less told them to keep their (literally) blinking lights and alighted by his own landing lights. Every time I took up my pen to sign my letters about 6 p.m. my lights went out. I am having luminous-dotted lines printed on all future notepaper.

One public benefactor took the opportunity of doing what he had craved to do for years, and drove his car boldly into the main hall, with head lights blazing. He was thanked by the whole community. What was not so funny was that all the aerodrome boundary lights went out—which might have been serious in some weather.

Incidentally, people in the hangars had to work on machines throughout most of the night preparing them with hand torches for the early morning services—which is scandalous.

One of the newspapers has been baying at that most credulous of moons, the public, once again. The story was that Imperial Airways were hardly treated at Croydon in the matter of hangar accommodation. True enough up to a point, but the writer might have added a statement to the effect that the Ensign class machines were ordered four years ago, and that, in that time, the authorities had done nothing about the accommodation question. Ten years ago *Flight* warned the Air Ministry of the future need for more accommodation, and the air traffic companies begged the authorities to take steps in good time. But four years or a decade are both the same to a mesmerised hen with its beak glued to a chalk line—and that's the answer.

A. VIATOR.

New Equipment for Finland

ACCORDING to reports, Aero O/Y, the Finnish Airline operating company, has placed an order for two Focke-Wulf Condors. Since the internal airlines are still unsubsidised and use comparatively small aerodromes, these two Condors will undoubtedly be put on the company's external services. Last summer Aero O/Y operated between Helsinki and Stockholm and between Helsinki and Tallinn, using Ju 52s.

COMMERCIAL AVIATION (CONTINUED)

The Christmas Rush

MOST people by now will have realised that the amount of mail being carried by air during the Christmas period on the Empire routes is very much greater than ever before, and all kinds and conditions of aeroplanes will be given the job of carrying it.

Among them will be *Mercury* and *Maia*, the upper and lower components of the composite aircraft, as well as three of Imperial Airways new 24-ton Short boats, *Cabot*, *Caribou*, and *Connemara*.

The floatplane will make five trips from England to Egypt, the first of which was scheduled to start last Saturday, and on each of these the 2,400 miles to Alexandria will be flown non-stop after being "composited" into the air. The three strengthened Short boats will be used on services as far as Kisumu on the South African route, and as far as Karachi on the Australian route. Altogether seventeen extra services by seaplane will be operated, in addition to the fifteen to be completed by landplane. Some of the flying boats will be completely stripped inside in order that all the space and payload may be utilised.

The landplane operations are interesting because the new route between Croydon and Calcutta will be covered for the first time in service, and the people in India will see their first A.W. Ensign. The route concerned, which has already been detailed in *Flight*, is by way of Paris, Marseilles, Rome, Naples, Malta, Benghazi, Alexandria, Lydda, Baghdad and Basra. All manner of H.P.42s, A.W. Atalantas, D.H.86s, and even an Avro 652 will go into harness, while on the Far Eastern section an Australian National Airways machine, presumably a Douglas D.C.3, will be used on the route between Sydney, Singapore and Calcutta.

Large-scale Testing

THE work of testing the really big transport machines which are now being built is one of considerable complication and must be planned with the utmost care. The first Boeing 314 Clipper, which is one of a fleet of six boats being produced for Pan-American Airways' oceanic services, has now finished its manufacturer's tests and has been taken over by the Civil Aeronautics Authority for official trials.

In the works tests, which were carried out under the command of Mr. E. T. Allen, a great deal of the internal space was taken up with test rigs of various kinds. For instance, on the control deck there were six different offices in which pressures, temperatures and vibrations were recorded and the readings of the various instruments were in certain cases permanently established by photographic methods. The bulk of the data was collected in a specially installed instrument board at the desk which, in normal operations, will be used by the captain.

As an instance of the sort of data which must be obtained, air pressure indications were recorded both at the points where the air entered and left the oil coolers in order that it could be seen how the cooling proceeded in various conditions. Temperatures were taken at the heads and bases of all the fourteen cylinders of one two-row Cyclone engine and at two cylinder heads and bases of each other engine, as well as at other accessory points such as magnetos, air intakes, and so forth.

During the taxying tests a special station was set up in what will eventually be the radio operator's quarters, and in this a set of instruments, the readings for which were also photographed, registered rate of turn, roll, elevator, rudder and aileron angles, air speed and engine speed. Finally, in one of the wing mail compartments a further "laboratory" was set up to check the amplitude and frequency of vibration at various points. Altogether, the tests included eighty take-offs and landings, about 450 miles of taxying, and some 5,000 miles of flying.

In general, the layout of the Boeing 314 is similar to that of the Short Empire boat in that the entire upper deck is reserved for the flying staff and freight. In a boat of such a size this permits the use of really adequate roominess for the six flight officers. This section of the boat has been carefully soundproofed so that the crew may talk in conversational tones. A special effort has been made to obtain light flying control in all axes, and this is obtained by providing special servo tabs for the control surfaces. A new advantage of full-feathering airscrews is seen in large machines of this kind, since if any trouble develops in any one of the four two-row Cyclones (1,500 h.p. maximum) it can be stopped entirely while mechanics reach and work on the engine concerned.

Lockheeds for Air Afrique

WE are becoming accustomed to the idea of buying American machines in Europe and even in this country for both Service and civil use. The latest order is from the French Air Ministry for three Lockheed Fourteens which will be used on the Air Afrique run to the Congo. The machines should be delivered in January.

British Airways, incidentally, have ordered two more for their West African service.

and D.C.4s for Australia

APPARENTLY Australian National Airways have placed an order for at least one of the new 40-passenger D.C.4s. This fact appears to be partially confirmed by the size of the new combined hangar administration and traffic building which the company is now putting up at the Kingsford-Smith Airport in Sydney.

No definite news is yet known about K.L.M.'s practical interest in this machine. They require larger types for their Far Eastern service in particular, and for several months pilots were being trained in tricycle technique with the aid of the company's Stearman-Hammond, which is now at Farnborough. One of the K.L.M. pilots, Cdr. Parmentier, of Mildenhall-Melbourne fame, recently went to Santa Monica to try out the prototype.

Ramadi and Portishead

ONE of the machines—the *Calpurnia*—being used by Imperial Airways for the work of carrying the Christmas mails on the Empire routes was wrecked on Lake Ramadi, Irak, last Sunday afternon. At the time of going to press the radio officer, B. Bayne-Rees, had been found dead, Capt. E. H. Attwood, First Officer A. N. Spottiswoode and F. G. Ubee were reported missing, and the two other occupants, D. E. Anderson and D. B. Harrison, were injured.

At the time of the accident there was, according to reports, a severe sandstorm blowing, and the last wireless message from *Calpurnia* was one asking for a bearing from Lake Habbaniya, whither the machine was bound. Lake Ramadi is about fifteen miles from this base.

On Tuesday afternoon of last week, when on one of the company's scheduled instructional flights, a British Airways Lockheed Fourteen crashed at Redcliffe Bay, Portishead, near Bristol. In the circumstances the machine carried only the instructor, Cmdr. E. G. L. Robinson, and another of the company's pilots who was being trained in Fourteen technique, Cmdr. R. P. J. Leborgne.

For the moment the reason for the accident is not known, and it seems that even those who conduct the official enquiry will have little else to work on except the evidence of a few witnesses who saw the accident. After the machine had struck the rocks in the Bay, apparently in a steep turning attitude, it caught fire. Both pilots were killed instantly.

In the death of Cmdr. Robinson British Airways have lost one of their most experienced pilots. Of his 4,500 hours' experience, some of which was obtained while flying with Algoma Air Transport in Canada, more than 600 were spent in command of Junkers Ju.52 on the London-Berlin mail run. He was one of the first, if not the first, of British Airways pilots to handle the Fourteen. One of his colleagues, who had flown very many hours with him on his favourite service—the Berlin night mail—has said that he had seldom known a pilot more in love with his work or one who more thoroughly understood the principles of flying commercial machines. He continues, "All those who had the privilege of working with him will remember the generous manner in which he placed at their disposal the immense store of knowledge which he had accumulated in his fifteen years as a commercial pilot."

Cmdr. Leborgne learned to fly with the Royal Air Force in 1930, and, after service with Imperial Airways and British Airways, he flew for Northern and Scottish Airways during 1936 and 1937 before rejoining British Airways. This year he had been in command of Lockheed 10A's on the London-Stockholm service, and his total flying experience was 2,200 hours, more than 800 of which were spent in charge of Electras. He had just started a Fourteen course. The same colleague writes that "at first glance Bob Leborgne never gave one an inkling of the nature of his work. Taught to fly in the best school in the world—the R.A.F.—his complete mastery of the modern science employed in operating up-to-date aircraft under all, and particularly adverse, conditions is a great tribute to his capability in absorbing knowledge. I flew many hours with him, and am well aware of the immense feeling of security which his presence at the controls gave me."

THE CIVIL SIDE at the PARIS SHOW

A Disappointing Offering : Large Commercial Types Represented by Mock-ups and Models : Odd Little Lightweights for the Private Owner

COMMERCIAL TYPES

IT is an unfortunate truth that air-operating companies will not find much to interest them at the Paris Aero Show. There is but a single real and complete commercial aeroplane exhibited, the Potez 662 four-engined monoplane, which is a development of the 661 now in use by the Air-Afrique company. The 661 has four Renault engines of 220 h.p. each, whereas the 662 is powered by four small-diameter Gnome-Rhône 14 Mars engines of about 640 h.p. each. As the machine is designed to accommodate 12 passengers only, the power expenditure is more than 200 h.p. per passenger. In return for this, the machine is expected to give a cruising speed of about 250 m.p.h., and should thus be the fastest commercial aeroplane in use.

In its general design the Potez 662 follows the classic formula: low-wing cantilever monoplane, four engines, v.p. airscrews, retractable undercarriage, trailing-edge flaps, and twin rudders. The ailerons are of the slotted type. When carrying 12 passengers the 662 has a range of 600 miles at a cruising speed of 250 m.p.h. The cabin is neither cramped nor particularly spacious, but is the sort of compromise one would expect in a commercial aeroplane de-

The French President, who displayed great technical knowledge during his tour of the stands, engrossed in the large scale model of the four-Diesel transatlantic Dornier.

"Flight" photograph.

Above is a model of the new Fairey commercial machine ordered by the Air Ministry. The Potez 662 (below) has four small diameter Gnome Rhônes and is probably the fastest transport machine in the world.

signed for such high performance. In any case, the duration of flight will not be more than about 2-2¼ hours, so there is not the same necessity for giving ample room.

The tare weight of the Potez 662 (fully equipped and including weight of crew) is 6,220 kg. (13,700 lb.) and the disposable load 2,260 kg. (5,000 lb.), giving a loaded weight of 8,480 kg. (18,700 lb.). The wing span is 22.4 m. (73ft. 6in.) and the wing area 64 sq. m. (689 sq. ft.), so that the wing loading is nearly 30 lb./sq. ft. At the operational height of 13,000ft. the maximum speed is 286 m.p.h.

A development of the four-engined Farman commercial aeroplane shown at the last Paris Aero Show, the Farman 2234 *Jules Verne* exhibited by the French Air Ministry, is intended for sub-stratosphere flying over the North Atlantic. The machine does not appear especially suitable for this kind of work, its flat-sided fuselage being just about the least suitable shape for a pressure cabin. After the experimental flights the machine will be used for carrying mails, and presumably no attempt will be made to make the cabin itself airtight.

Few particulars are available, but the machine is a high-wing strut-braced monoplane, the wings of which show a pronounced taper in contradistinction to most Farman machines. The four Hispano-Suiza liquid-cooled engines are mounted in tandem pairs on outriggers from the fuselage, and the undercarriage wheels retract into the space between the engines in each nacelle.

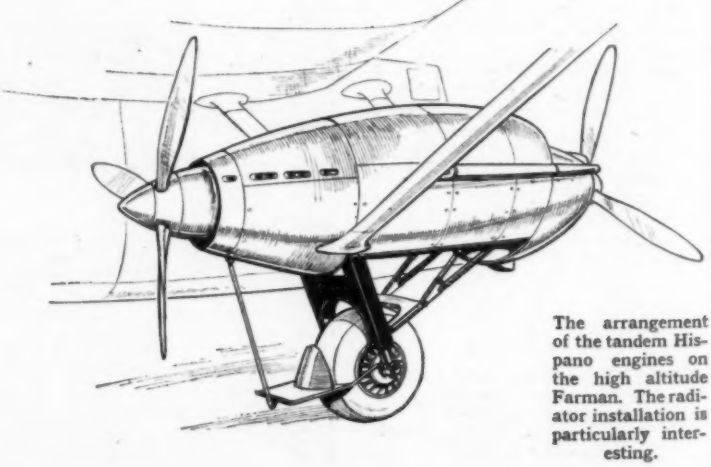
The 2234 is being supercharged to fly at 20,000-25,000ft., and at that height the cruising speed is expected to be in the neighbourhood of 215 m.p.h. The gross weight is 25,000 kg. (55,000 lb.).

Built as a "flying scale model" of a large transatlantic machine, the CAMS 160 is a small six-engined flying boat of slightly less than one-half the size of the type 161, which it represents. Although the machine has done a good deal of flying, it is of no particular interest in itself, being of wooden construction and not a practical aircraft, although it has doubtless taught its designers quite a lot. The actual 161 will have a gross weight of 40,000 kg. (88,000 lb.) and a wing span of 46 m. (151ft.). Engines totalling 5,580 b.h.p. are assumed, and the range is expected to be 5,000 miles.

An elaborate mock-up of the LeO H.49, comprising the entire hull, a wing portion, and the tail, is shown by the French Air Ministry. The hull is resting on artificial "water," and looks quite realistic. There is a constant stream of visitors to the extremely spacious cabin inside, in which, for once, space commensurate with long journeys has been provided. Named *Rochambeau*, the actual series number of the machine is the S.E. 200 (from the fact that the Lioré et Olivier firm is now part of the Sud-Est group of nationalised factories). Some idea of the ambitious nature of this project may be formed from the fact that the estimated gross weight will be 60 tons (132,000 lb.) and the wing span 171ft. There will be accommodation for 40 passengers and 9,000 lb. of freight. The commercial load is expected to be 23,000 lb. and the cruising speed 200 m.p.h. A range of 3,700 miles against a head wind of 37 m.p.h. is calculated.

THE LIGHTER SIDE

IT cannot be said that the private owner is well catered for. Few types with any serious claims to attention are exhibited, and the lighter stuff is—well, very light and rather flimsy-looking. Notable exceptions are the Miles Monarch, shown on the de Lavaud stand, and the two Tipsy two-seater monoplanes, one with transparent cabin roof and the other open. All these are practical aeroplanes with a serious purpose and an established reputation. It would appear that the explanation is that the large French aircraft firms are concentrating exclusively on military work, and that such light aeroplanes as



The arrangement of the tandem Hispano engines on the high altitude Farman. The radiator installation is particularly interesting.

"Flight" photographs.

The mock-up of the S.E.200 trans-atlantic leviathan (top) is devouring an endless stream of visitors. Below it is the little Zlin XII touring type.

are to be seen have been designed and built by small firms with limited resources. M. Laurent Eynac is apparently trying to pull *l'Aviation Populaire* together, but until some more clear-cut policy is evolved the lighter side is not making much real headway.

The S.F.C.A. company exhibits two types, of which the larger achieved a speed of 220 m.p.h. at 4,000ft. in 1936, and 286 m.p.h. at ground level—this was with a Renault engine of 220 h.p. This year the Lignel 20s (*l'Eclair*) is being fitted with a 360 h.p. Regnier, and will be used next year for attempts on world's records over 2,000 km.

The other Lignel, the type 31 *Mistral*, is painted white and is mounted in the attitude of a banked turn. It is singularly reminiscent of the Percival Mew Gull, and with a 360 h.p. 8-litre Regnier engine is expected to do 310 m.p.h. Next year it will attack the world's speed record over 100 km. and 1,000 km.

Paul Aubert has gone in for ultra-simple construction, and shows two machines, the *Cigale*, type P.A.20, and the *Cigale Major*, type P.A.204. The latter is shown without engine, but with cowling and airscrew in place. The former is a two-seater and is fitted with 90 h.p. Regnier engine. The *Major* is similar, but is a four-seater, and *transformable en sanitaire*. Renault and Regnier engines of 145-150 h.p. can be fitted.

Most of the ultra-lights are grouped together in one gallery (A). They seem to be rather underpowered for their size, particularly in view of the fact that the designers have attempted to give cabin comfort and side-by-side seating on very modest power.

Avions Atalante show a G.B.10 strut-braced monoplane, in which one strut on each side is relied upon to take the lift, the wing being presumably stiff enough in itself to resist drag and torsion loads. With a 70 h.p. Regnier engine the cruising speed is just over 100 m.p.h. at a fuel consumption of 3¼ gallons per hour.

The Club 45, shown by Avions Gerard, is a side-by-side high-wing cantilever monoplane with 45 h.p. Persy II engine. The tare weight is given as 310 kg. (683 lb.) and the gross weight as 550 kg. (1,212 lb.), so that it will be appreciated that for a wing area of 155 sq. ft. the construction is very light.

L'Elytroplan is the name given to a curious little light plane with Mengin engine also shown in this gallery. The machine has no tailplane or elevator, the fore-and-aft control being by a small auxiliary plane mounted on struts a considerable distance above the main wing. Ability to land without run is claimed, and we are informed that the prototype has made over 1,000 flights and landings, so that apparently the scheme works.

A year or two ago the Société du Duralumin organised a competition for light plane designs, and adjacent to the Duralumin stand are three machines built for this competition. The Daspect is a low-wing, strut-braced single-seater of fairly orthodox design. Another, the Allar, is a pusher two-seater cabin monoplane with tricycle undercarriage, and the third is the double-wing Kellner-Bechereau, in which the stressed-skin wing is split spanwise by a full-span slot situated slightly aft of the mid-chord.

Czechoslovakia is represented by two light planes, the Zlin XII and the Benes & Mraz Superbibi Be 555. The former is a tandem-seater low-wing monoplane with Walter Mikron engine, and the latter a side-by-side monoplane with Walter Minor. Both are simple, sensible machines.

"Flight" photograph.

The mid-wing Delanne sailplane over the practical-looking side-by-side two-seater Tipsy.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

THAT RAE REPORT

"A Very Serious Thing"

AT first I did not know whether to be amused or made indignant by the letter from your correspondent "E. H. T." (*Flight*, November 17). But if the suggestions are true, surely it is a very serious thing. I should think a committee of inquiry ought to find out who is to blame if things have to be left undone or done wrongly.

The country is spending enormous amounts of money now, and taxes are likely to be higher. Surely it is a great waste to double the staff of a directorate if the "useful administrative output" does not increase, and we ought to be told about the increase, because we obviously have to pay for it.

If the existing civil servants have failed to carry out the Civil Service tradition, the establishment of another post for a civil servant in or over the directorate will not be much to the taxpayer's advantage M.J.T.

Herts.

We Have and We Do

I AM quite upset by seeing that you have printed my letter drawing attention to the lighter side of the Rae Report. This shows that you allow publicity to the view of a person whose neckwear may be a mixture of colours unknown to you or anyone else. You seem to print things simply because they are written in the light of facts. Had Lord Halifax got up after comparing with Mrs. Chamberlain, over a cup of tea and home-made cake, his religious predelictions and her love of the Greek tragedies, and had he written a letter to a certain "authoritative" newspaper about the partition of Czechoslovakia, I could have expected its contents to be printed, without, of course, the author's name—say, as a leading article. But to print facts about the acts of those in authority, instead of hypno-suggestions and wish-beliefs, is a thing which is bound—and not for the first time, I must remind you—to cause to your readers the odd little pain that sometimes comes from thinking.

And I am afraid that you will be getting into trouble with some very influential people. E. H. T.

London, S.W.1.

IMPERIAL AIRWAYS' FUTURE

An Opportunity

THE decision of the Government to reconstruct Imperial Airways on the basis of the B.B.C. is welcome, as it shows that they realise the importance of the company to this country in particular and to the Empire in general. Another indication is the fact that they released Sir John Reith from his former duties as head of the B.B.C. at a time when the broadcasting service of the State is of the greatest international value.

Having decided to make the step, now is a great opportunity for the Government to make Imperial Airways "Imperial" in more than name. The idea may not be practical politics, but practical it is. Instead of issuing stock to the public, it should be issued to all Governments of the Empire, and directors from the Dominions should sit on the Board. High Commissioners might become "de facto" directors.

Providing that Imperial Airways became a company run by and for the Empire, the Dominions should not object to the fact that the control of lines running over or near their territories is centred in London, so long as they can make their opinions effective. This being done, it will no longer be necessary to negotiate for years in order to extend the system, whilst foreign competitors forge ahead. Also it will not be essential to form a fresh company when another Dominion comes into the network, as has happened in the case of the extension from Sydney to Auckland, when, after much negotiation, a company has been formed, made up of Australian, New Zealand and United Kingdom interests.

With all respects to Sir John Reith, it is doubtful if he, or anyone else, can envisage what flying will be like in 1948, and the foundations for that year have to be laid *now*. What may we expect then? Services every six hours from Langstone Harbour (if ready) to Alexandria *via* Gibraltar and Malta, twice daily services from Alexandria to Durban and Auckland. Twice daily services to New York, connecting with a daily service across Canada to Vancouver and on across the Pacific to Auckland?

And what of the various types of services? Obsolete passenger machines, which are out of date at the end of three years, but have a flying life of ten, will carry light and perishable freight. Depreciation is the most expensive item in the running expenses of air transport companies, and, being already written off, these machines should earn a very welcome profit.

Express air mails may also be run, that is to say that all mails will go by air, but for a surcharge, possibly a high one. 350 m.p.h. composite machines will carry express mail to Australia in 36 hours—and there may be space for an occasional passenger.

As services on all routes will be run at least twice daily, passengers not pressed for time will be able to make overnight stops and be sure of catching another machine 12 hours later.

All nations will require highly efficient air services, and to the British Commonwealth air services may one day be a matter of life or death. Unity is strength. W. L. N.

London, W.9.

DIVE-BOMBING TACTICS

Addenda to an Article

TWO points need slight clarification in my article, "Carrier at Exercise," which appeared in *Flight* last week.

In dive bombing (as the name implies) the bomb is released in the dive. This directs the bomb towards the target. It also gives the bomb initial acceleration. My phrase "flattened out and released their bombs" should, therefore, be transposed to read "released their bombs and flattened out."

In dive-bombing it is the pilot who releases the bomb. Thus, when I was discussing the relative merits of dive-bombing and torpedo attack I should have written: "Unless the pilot is prepared to continue his flight he may disturb the aim of the bomb aimer *following him* . . ." NORMAN MACMILLAN.

London, S.W.3.

IN BRIEF

A 25-year-old Australian reader, Mr. L. Auty, of 16, Ryot Street, Warrnambool, Victoria, wishes to correspond on aviation subjects with kindred spirits in this country.

Forthcoming Events

DECEMBER.

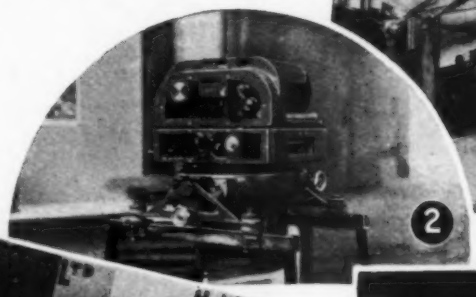
Thurs., 1st.	**Herts and Essex Aero Club: Annual Dinner and Dance, Park Lane Hotel, London, W.1.**
Thurs., 1st.	**R.Ae.S. Lecture*: "Flying Controls," by Prof. G. T. R. Hill, M.C., M.Sc., F.R.Ae.S.**
Thurs. 1st.	**British Air Line Pilots Association: "At Home" and Dance, Dorchester Hotel, London, 9 p.m.**
Fri., 2nd.	**Eastbourne Flying Club: Annual Dinner and Dance, Grand Hotel, Eastbourne.**
Tues., 6th.	**R.Ae.S. Isle of Wight Branch Lecture: "Flight Testing," by Capt. Courtney.**
Thurs., 8th.	**R.Ae.S. Students' Section: Joint Lecture with I.A.E. Students' Section: "Carburation and Induction in Aircraft Engines," by K. C. Hunt; 12, Hobart Place, London, S.W.1.**
Thurs., 8th.	**R.Ae.S. Portsmouth Branch Lecture: "Retractable Undercarriages," by G. H. Dowty.**
Fri., 9th.	**Northampton Engineering College Past Students' Association: Annual Dinner, Café Royal, London, 7.30 for 8 p.m.**
Tues., 13th.	**Colleges of Automobile and Aeronautical Engineering: Annual Dinner and Dance, Grosvenor House, London, 7 for 7.30 p.m.**
Thurs., 15th.	**R.Ae.S. Yeovil Branch Lecture: "The Paris Aero Show," by W. E. W. Petter.**
Thurs., 15th.	**R.Ae.S. Coventry Branch: "Aero Engine Carburation," by E. W. Knott, M.I.A.E., M.S.A.E.**
Thurs., 15th.	**R.Ae.S. Lecture*: "Some Results from the Deutsche Forschungsanstalt für Segelflug Smoke Tunnel," by Herr A. Lippisch, A.F.R.Ae.S.**
Thurs., 15th.	**D.H. Aeronautical Technical School: Reunion Dinner, London Aeroplane Club, 8 p.m.**
Tues., 20th.	**R.Ae.S. Isle of Wight Branch: Debate.**
Tues., 20th.	**R.Ae.S. Students' Section Lecture*: "The Air Mail Scheme," by Gibson Pattison, F.S.S.**

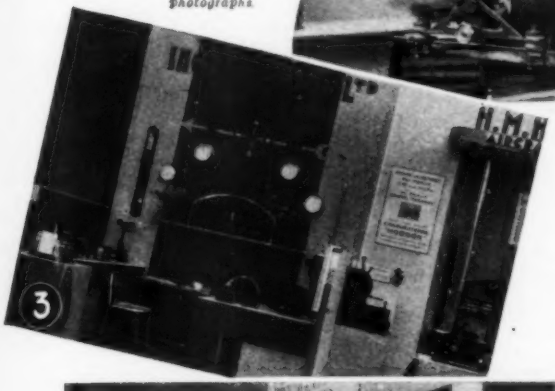
* All these lectures take place at 6.30 p.m., at the Institution of Mechanical Engineers, Storey's Gate, London, S.W.1.

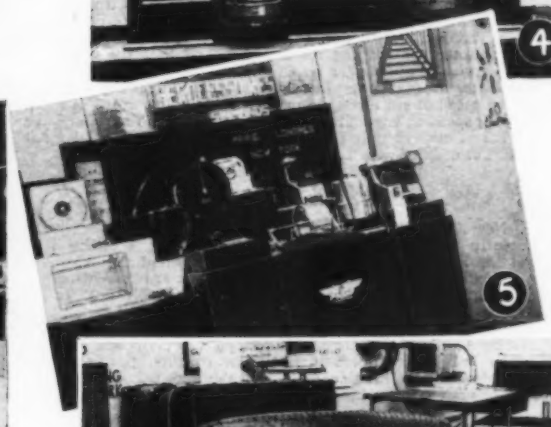
IN the PARIS GALLERIES

Some Glimpses of British Equipment on Show

"Flight" photographs.







(1) Engines and v.p. airscrews on the De Havilland stand.

(2) The sectioned Williamson Eagle IV air camera.

(3) Short and Mason instruments.

(4) A Smith's Aircraft Instruments display panel.

(5) Simmonds Aerocessories.

(6) Standard Radio.

(7) Hobson carburation equipment.

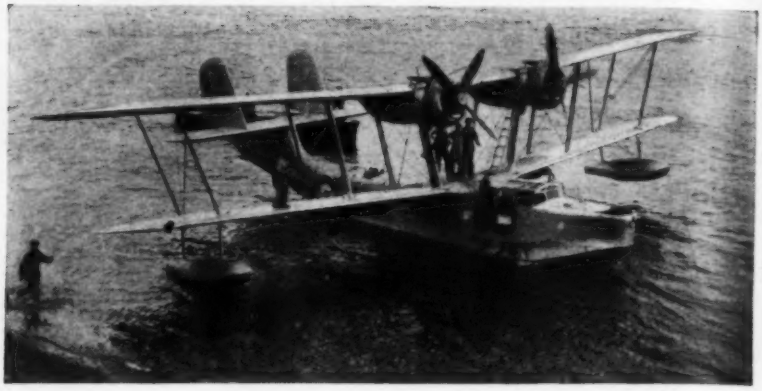
(8) Crash-proof tank on the Gallay stand.

(9) The P.B. auto pilot with Marconi D/F control.

(10) Undercarriage equipment from Cheltenham.

SERVICE AVIATION

Royal Air Force and Official Announcements : Fleet Air Arm News : Military Aviation Abroad



The first of the Canadian-built Supermarine Stranraers (two Bristol Pegasus) on the St. Lawrence River. Ten are being constructed by Canadian Vickers, Ltd.

The Miles Master

THE official name of the two-seater advanced training monoplane in production for the R.A.F. at the Reading works of Phillips and Powis Aircraft, Ltd., is Master I. It is powered with a Rolls-Royce Kestrel XXX engine, power figures for which are not at the moment available. It is known, however, that this engine is specially adapted for training requirements and that the estimated maximum speed of the Master is 268 m.p.h. at 15,000ft. Other data for the Master are:—Span, 39ft.; length, 30ft. 5in.; wing area, 210 sq. ft.; top speed at sea level, 210 m.p.h.; climb to 15,000ft., 10 min.; and cruising speed at two-thirds power at 15,000ft., 226 m.p.h. Each cockpit has a control unit incorporating an adjustable rudder bar and a control column with brake attachment.

R.N.Z.A.F. Expansion

THE New Zealand Defence Minister, Mr. F. Jones, announced recently that the foreshadowed expansion of the Royal New Zealand Air Force would call for 200 enlistments and that two new Service aerodromes are being surveyed. The sites are at Whenuapai, near Auckland, and at Ohakea, near Palmerston North, both in the North Island. The Auckland base at Hobsonville is essentially a flying boat station and has been considerably overcrowded, while commercial developments have overcrowded the civil field at Mangere. The Palmerston North base will be the first purely service field to be built in the interior of the North Island, being in a central position for craft landing from all over the Island.

F.A.A. Writer and Supply Ratings

LARGE numbers of junior Writer and Supply ratings are required at an early date in connection with the transfer of the Fleet Air Arm to Naval control. The numbers of entries at the examinations in March, July, and November are being increased.

Candidates who show promise of being suitable for transfer to the Writer and Supply branches are to be given a month's trial in a ship or establishment under the supervision of an experienced Accountant Officer. If an application made on his behalf is approved, the rating will be transferred at once and remain for three months in his ship or establishment as a supernumary under training, and then be considered as fit for draft.

Public Schools and the R.A.F.

A MEETING of the Public Schools Careers Association was held recently at the Air Ministry under the chairmanship of Lt. Gen. Sir Wm. Furse, K.C.B., K.C.M.G., D.S.O., at which particulars of the careers available in the Royal Air Force were furnished by representatives of the Ministry. Special reference was made to the advantages of entering the Service under the short-service commission scheme and to the need for large numbers of suitable candidates for training as pilots under this system arising from the expansion of the Royal Air Force. Attention was also directed to the special organisation which has been successfully engaged in the Air Ministry for some years past in arranging suitable employment for short-service officers on leaving the Service.

It was pointed out that direct contact exists between the Royal Air Force and public schools by the appointment of Royal Air Force Officers as liaison officers with their old schools. Since January last some of these schools have also been affiliated to a Royal Air Force unit which is responsible for providing boys who are members of the Officers Training Corps with certain training in air subjects.

The following schools were represented: Aldenham, Bedford, Blundell's, Bradfield, Brighton, Bryanston, Canford, Cheltenham, Cranleigh, Eton, Felsted, Harrow, Imperial Service College, Leys, Malvern, Radley, Repton, Rugby, St. Edmund's (Canterbury), Shrewsbury, and Tonbridge.

F.A.A. Officers

SINCE April last, when the Admiralty began to grant short-service commissions as officer pilots in the Fleet Air Arm, nearly 200 such commissions have been granted. This number includes direct entries and also transfers from the R.A.F. and is additional to permanent naval officers who are employed in the Fleet Air Arm.

For Permanent Commissions

PERMISSION was granted to 246 short-service officers of the General Duties Branch to sit for the examination to qualify for permanent commissions. As an exceptional measure, the examination this year was not held until November 15 and 16. This prospect of a notable increase in the number of permanent officers points to the extreme unlikelihood of any reduction in the R.A.F. for some considerable time to come. It also enhances the value of a short-service commission as a probable introduction to a life's career in the Service.

The Comrades Dine

WHEN over 800 men of all ranks, retired and serving, gather together to dine, talk and renew old friendships, the occasion unquestionably merits the title of "reunion."

To the eighth annual dinner of the comrades of the Royal Air Forces Association, held in London last Saturday, members had travelled from all over the country, while the majority of the officers comprising the Air Council were likewise present—almost all of them in the capacity of members.

It is the primary object of the Association to keep past and present members of the Service in touch.

After the toast of "The King," and the moving "Silent Tribute," given by the hon. general secretary, Flt. Lt. E. E. Ellison, "The Royal Air Force" was proposed by a member of the C.R.A.F.A. London Branch, Mr. K. E. Kingsmill. Recalling his early service, he said that, when the R.F.C. was born of the Royal Engineers, they were told that the infant Service was expected to show the efficiency of the Royal Engineers coupled with the discipline of the Guards. "We soon reached the former," said Mr. Kingsmill. "But we have never attained the latter—thank goodness." He concluded with a tribute to Group Capt. J. W. Cordingley, O.C. Records, who, it seems, keeps in touch with ex-Service people in a manner bordering on the miraculous.

Air Chief Marshal Sir Cyril Newall, Chief of the Air Staff, was called upon to respond. He pleaded with his audience to play their part in educating a public sadly misled by those newspaper "crisis critics," who alleged grave shortcomings in our Air Force. He was reminded of their propensity for putting two and two together to make five by an incident a few weeks ago. Two evening paper placards in juxtaposition read "Gunfire in the North Sea" and "Collapse of the Arsenal."

He insisted that the proposed increase in our fighter strength would not be at the expense of our offensive power. He emphasised that "First-line strength as a yardstick of parity means nothing at all," then went on to give some figures which, while not altogether new, are profoundly convincing when lifted from the mathematical morass of the Air Estimates. For instance, whereas the Air Force appropriation in 1934 was 17½ million pounds, next year it will probably approach 200 million. In 1934 personnel totalled 31,000; now it numbered 85,000; the figure would increase to 100,000 odd next summer, and ultimately to 125,000.

Paying a tribute to those responsible for the success of the Wellesley long-distance record, the C.A.S. said that the Air Ministry was opposed to records *qua* records, but "If in the normal development of long-distance, high-altitude or other aircraft we can pick up a record or two, it is our duty to do so."

Before replying to the toast of "The Association, its President and Vice-Presidents," given by Sqn. Ldr. V. F. Whatling, Air Chief Marshal Sir J. M. Steel read a telegram received in reply to a

SERVICE AVIATION (CONTINUED)

message sent that evening to His Majesty: "The King sincerely thanks the Comrades of the Royal Air Forces Association for their loyal greetings, which he heartily reciprocates."

In response to the toast of "The Visitors" (proposed by Wing Cdr. J. M. Glaisher), Capt. H. H. Balfour, Under-Secretary of State for Air, opened by quoting the ancient civilisation of China, which made postprandial oratory a capital offence; then he proceeded to commit the offence, but mitigated it by a first-class series of yarns from his own Service experience. Best, perhaps, was his claim to have created a world record in 1918, when he was stationed at Bircham Newton. Members of his squadron used to fly to the coast to bathe. "I claim to be the first man to have flown naked over Hunstanton," said the Under-Secretary.

Seconding the response, Col. Sir Donald Banks, Secretary of the Air Ministry, said that he at last had an opportunity of thanking the Royal Air Force for something which happened to him as an infantry officer in 1918. After a tough fight he found himself alone, tired, hungry and thirsty, and, worst of all, cigaretteless. A British aeroplane approached, flying very low. The pilot dropped a message bag (he had the streamer still). Inside was a tin of Goldflakes and the note, "Well done, P.B.I.!"

And on that characteristic note, and with the presentation of certain prizes by Air Marshal Sir J. M. Steel, supported by Air Comdre. B. C. H. Drew, who had presided, ended a notable and valuable reunion.

Dinners and Reunions

THE seventeenth annual dinner of the R.A.F. Medical and Dental Services will be held at the May Fair Hotel, London, on Friday, December 2, at 7.30 p.m. for 8 p.m. The dinner is open to retired medical and dental officers, members of the Auxiliary Air Force and Volunteer Reserve Medical Branches, and to civilian medical practitioners at R.A.F. stations. Tickets, 10s. 6d. each, exclusive of wines, may be obtained from the honorary secretary, Wing Cdr. A. Harvey, Directorate of Medical Services, Air Ministry, 5-6, Clement's Inn, London, W.C.2.

The annual reunion dinner of the officers of No. 3 Squadron will be held at the Grosvenor House, Park Lane, London, W.1, at 20.00 hr. for 20.15 hr. on Friday, December 2. Tickets—25s. each, inclusive of wines—may be obtained on application to F/O. D. T. Collins, No. 3 (Fighter) Squadron, Kenley, Whyteleafe, Surrey. Past and present officers of the squadron who have not received an invitation are asked to communicate with him.

The twentieth reunion dinner of the naval, military, and air forces which served up-river in connection with the relief operations on the North Dwina, 1919, will be held on Saturday, December 3, at the United Service Club, Pall Mall, London, S.W.1. Officers who have not received notices are requested to communicate with Capt. G. R. Singleton-Gates, M.C., The Press Club, Salisbury Square, E.C.4.

A coming-of-age dinner of No. 99 (B.) Squadron will take place at the May Fair Hotel, London, on Saturday, December 17. All past and present officers wishing to attend are invited to communicate with P/O. E. V. Hulbert, Royal Air Force Station, Mildenhall, Bury St. Edmunds, Suffolk. The price of tickets is 20s.

The annual dinner of the University of London Air Squadron will be held at the Rembrandt Hotel, South Kensington, on December 8, at 7.45 for 8 p.m. Sir Kingsley Wood has accepted an invitation to be present.

Training Recruits

SUB-DEPOTS for training recruits have been established at ten stations, namely, Dishforth, Driffield, Finningley, Linton-upon-Ouse, Usworth, Scampton, Upwood, Brize Norton, Debden, and South Cerney.

Royal Air Force Gazette

General Duties Branch

The following Flying Officers are promoted to the rank of Flight Lieutenant on the dates stated:—B. G. Morris (September 16); W. H. Kearney (Acting Flight Lieutenant) (October 16); M. Hallam (November 3).

F/O. (Honorary Flt. Lt.) H. C. Bazeley (Captain, Royal Artillery) is promoted to the rank of Flight Lieutenant with effect from September 15 and with seniority of September 15, 1937; F/O. C. L. Troop (Captain, Duke of Wellington's Regt.) is promoted to the rank of Flight Lieutenant with effect from September 15 and with seniority of September 15, 1937.

The following Flying Officers are granted the acting rank of Flight Lieutenant on the dates stated:—E. G. Campbell Voullaire (September 12); M. M. J. Stevens (September 15); D. C. Smith (October 1); C. M. Lester (October 15); P. J. C. Canney (October 19); D. S. MacDonald (October 24); W. A. A. de Freitas (October 31); J. D. Ronald (November 3).

F/O. C. E. E. Florigny relinquishes the acting rank of Flight Lieutenant (November 6); Sqn. Ldr. G. F. Overbury is transferred to the Reserve, Class A (November 1) (substituted for notification in *Gazette* of November 1); Flt. Lt. D. B. McGill is transferred to the Reserve, Class C (November 7).

Dental Branch

F/O. N. L. Newman, B.D.S., is promoted to the rank of Flight Lieutenant (September 6).

Princess Mary's Royal Air Force Nursing Service

The following Staff Nurses are promoted to the rank of Sister on the dates stated:—Miss J. A. M. Sefton (November 1); Miss P. Giles (November 8); Miss M. M. Burton (November 10); Miss C. McK. S. Smith (November 15).

Royal Air Force Reserve

RESERVE OF AIR FORCE OFFICERS

General Duties Branch

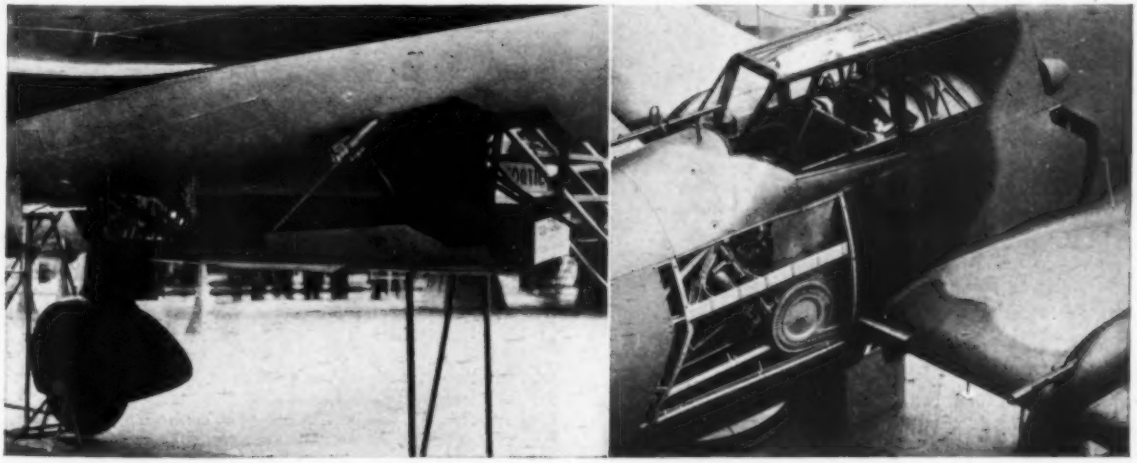
Flt. Lt. L. E. Chiswell is employed with the Royal Air Force (November 15); Flt. Lt. P. F. Foss is transferred from Class A to Class C (October 26).

Auxiliary Air Force

General Duties Branch

No. 502 (ULSTER) (BOMBER) SQUADRON.—F/O. M. J. C. Stanley is promoted to the rank of Flight Lieutenant (October 5).

Owing to the greatly increased length of these lists, as a result of R.A.F. expansion, ranks are confined to those of Flight Lieutenant and above.



ARMAMENT IN PARIS: On the left is the retractable gun and bomb-aiming position on the P.Z.L. single-engined general-purpose machine. The unorthodox Fokker D.23 single-seater fighter (right) has unusual ammunition feed arrangements for its Browning guns, designed to economise space.

PRIVATE FLYING

"Flight" photograph

New Ideas

SINCE the spate of rationalised light aircraft which appeared in the United States a year or two ago we have heard very little more about the idea of simplifying the handling and general characteristics of private owners' aeroplanes. Apparently the manufacturing concern behind the most interesting of these American developments, the Stearman-Hammond, has gone into liquidation, and the promising little Gwinn Aircar may have received a crucial blow by the accident in which Frank Hawks was killed while flying one of these machines.

In the case of the Aircar the accident was not, so far as one can discover, caused by any particular feature of the machine itself, in which the controls were arranged to be as simple as possible and to justify the name by which the machine was known. The accident might just as easily have happened in any other aeroplane, and was caused simply through collision with an obstruction.

The Stearman-Hammond, on the other hand, may have been a little too far ahead of its time. Not only was it a tricycle pusher with an unconventional control layout, but it was also of all-metal construction with stressed-skin covering, and unless hundreds or even thousands of owners saw fit to buy the machine the price was bound to be very high.

Nevertheless, when I flew the particular version of this machine which was (and presumably will again be) used for training K.L.M. pilots in the new tricycle technique, I certainly felt that here was something brand new and good in the light aeroplane line—something which ought to be followed up. The machine seemed to be noisy by modern standards, and its performance was no better than that of comparable machines with a standard layout. But it was easy to fly. In fact, it was so easy that a pilot trained on a conventional aeroplane would probably find rather more difficulties with it than would the complete novice, who would treat it as some new kind of car.

The only difficulties for him would be the facts that the throttle is hand-operated, and that there is one more plane of control—up and down. The wheel is used for direct steering whether in the air (through the ailerons) or on the ground (through the front wheel).

K.L.M.'s Stearman is now over at Farnborough, where the R.A.E. people, I believe, have a big programme of tricycle development testing. The Air Ministry seems to be really keen on the tricycle idea, and believes that it will be a normal undercarriage for all types of aeroplanes in a few years' time—and that in spite of a considerable and persistent criticism from certain quarters. Since I first flew the little Dutch Scheldemusch I have had no doubts about the future of this type of undercarriage.

Simplification

TAKING it for granted that the tricycle undercarriage has come to stay, the obvious follow-up is the simplification of control systems. The two go hand in hand. Once you have taken away the necessity for really accurate control at low speeds near the ground there is no further need for the personal co-ordination of the three different controls. Where absolute accuracy is not essential the co-ordination can be arranged mechanically.

Although we in this country have been a little slow both over the tricycle and the idea of flying simplification, we seem now to be taking the matter up more or less where the Americans have temporarily dropped it—owing, in the majority of individual cases, to lack of funds. The original experiments over there were all sponsored by the Bureau of Air Commerce, and it is early yet to guess what the new Civil Aeronautics Authority will do about the matter.

Over here there are one or two firms with machines, either actually made or in the course of construction, having some form of interlinking of controls. In one the rudder and ailerons are experimentally connected, so that a control wheel operates both, and this is used, in the ordinary course of events, to steer on the ground through the front wheel.

While thinking in terms of car similarity, I doubt the wisdom of going so far as to arrange that the throttle shall be foot-operated. Ninety-five per cent. of one's flying is carried out at a constant throttle opening and the job of keeping one's foot part-way down with a special degree of pressure will be a painful one. A lockable hand-operated lever might be arranged in conjunction with the pedal, which would then be used only on the ground.

Another machine in which the simplification has been extended to the point of designing a special arrangement of control surfaces, is at present awaiting further development. The firm concerned is producing a more conventional aeroplane for C.A.G. training, but they feel that when a sufficiently large number of new pupils have learned to fly, a small percentage of them will want to buy their own aeroplanes and will tend to favour some easy and safe machine, which is, at the same time, sold at a reasonable price.

Promise

ANYWAY, it is pleasant to know that a few manufacturers still believe that the private owner—and, in particular, the novice private owner—is still worth working for. Nobody can blame manufacturers as a whole for laughing aside the tiny market which is at present available, though I am still convinced that the one or two who remain in the light aeroplane business, and continue with the development of interesting ideas for safer and easier flying, will benefit in the end.

For years we have put up with conventional machines which, though easy enough to fly after specialised training, are hardly likely to interest the man or woman who had never been in the air before. While learning to fly, one of the most unpleasant discoveries concerns the fact that the apparently important business of going solo is nothing but a prelude to dozens of hours of practice which must be put in before one can reasonably be considered as even a fairly accomplished pilot.

[Cont. overleaf

Topics of the Day

Taking a lesson from the American experiments, it will obviously be far better if work on control simplification proceeds slowly and cautiously. People are frightened off if too many new ideas appear in one machine, and, in any case, it is not satisfactory to try to do too much at once. On a larger scale this has been apparent in the development work on the D.C.4. Not only was it the largest transport to be built in the United States, but it was also the first to be fitted with a tricycle undercarriage and the first to be designed with a pressure cabin. For the moment the pressure cabin idea has been left out, and the necessary experiments will presumably be made on the second of the series after any other minor difficulties have been finally dealt with.

As I have said very often, flying people are among the most conservative in the world and new ideas must be fed to them one at a time. Let us first get them used to the tricycle and then they will be ready, perhaps, to give their blessing, as instructors, to simplified control layouts.

INDICATOR.

FROM the CLUBS and SCHOOLS

ABERDEEN

OVER 18 hr. were flown by C.A.G. members last week, on one day of which flying was cancelled owing to heavy rain and winds.

IPSWICH

More than 25 hr. were flown last week. Mr. R. Burch is the first Ipswich Civil Air Guard member to get his "A" licence.

EXETER

Nineteen hours were flown during last week. There have now been 350 applications and 58 enrolments for the Civil Air Guard.

LONDON

The flying time for last week was 82 hr. Messrs. A. L. C. Chalk and J. H. Weaver have now completed their "A" licence tests.

PLYMOUTH

Last week only six permissible flying half-days were experienced. Over 14 hr. were flown, of which 5 hr. were commercial and the remainder club flying.

WESTON-SUPER-MARE

Eleven hours were flown during the week. There have to date been 48 enrolments in the Civil Air Guard.

WITNEY

Miss Joyce Buist and Mr. Goring Benge have now passed their "A" licence tests. During last week, in spite of two blank days, 42 hr. were flown by the club.

SHEFFIELD

Miss Margery Spiller has joined the instructional staff of the Sheffield Aero Club as chief instructor and manager at the club's new aerodrome at Firbeck, near Worksop.

CINQUE PORTS

Over 51 hr. were recorded during the past week. Miss Joan Goodall and Mr. Mirielees have passed their "A" licence tests, while Mr. Parnell and Miss Davies have gone solo.

EASTBOURNE

During the last week 41 hr. were flown by the club. Messrs. C. Baker and M. Lees have completed their "A" licence tests, while Messrs. J. W. Fidlin and W. V. Bedford have gone solo.

LUTON

Messrs. Clarke, Hind-Smith, Mulraney, Vigers, Ward and Weir have now gone solo, while Mr. R. H. Read has obtained his "A" licence. During last week 19 hr. were flown by the club. On December 8 a dance has been arranged for members and guests.

PORTSMOUTH

Thirty-two members of the C.A.G. are now flying solo, while 114 members of this body are under instruction. During last week 118 hr. were flown by C.A.G. members and 60 hr. by the club.

BORDER

In spite of bad weather 105 hr. were logged by the club during November. Seven C.A.G. members have reached the solo stage, and one, Mr. O. S. Buglass, has passed his "A" licence altitude test.

NORTHAMPTON

New members include Messrs. T. Saxby, E. J. Seddon, A. S. Felton and Mrs. L. V. Miller. Mrs. E. Goldsmith has gone solo.

HANWORTH

Miss V. Mindelsohn and Messrs. V. J. Day and L. Morris have passed their "A" licence tests, while Messrs. C. Carr-Young and D. Mitchell have gone solo. The flying time for last week amounted to 79 hr.

READING

Two really good flying days have enabled Messrs. G. Baker, F. Green and J. Speer to complete their "A" licence tests. Mr. Charles Barnes has gone solo. Another Hawk Major has been added to the club's fleet.

MARSHALLS', CAMBRIDGE

The flying time for the club last week amounted to 87 hr. Mr. A. D. Walker has joined the club, while Mr. A. Pirie and L. D. Roper, of the C.A.G., have obtained their "A" licences. A new machine has been acquired by the club.

THANET

In spite of very rough weather the week's club flying totalled over 27 hr. Some 40 C.A.G. members are at present being trained on the two Hornet Moths. Three have already obtained their "A" licences and four more are well on the way.

YAPTON

During last week 30 hr. were flown by club members, while C.A.G. members recorded 71 hr. Nine C.A.G. members have reached the solo stage, and one has qualified for his "A" licence. Fifty-eight C.A.G. members are under flying instruction.

YORKSHIRE

Mr. J. A. Lacey has joined the club instructional staff, bringing the total number of instructors up to six. Over 171 hr. were flown by the club during the past week. The annual ball, held at Harrogate last Friday, was one of the most successful of the series.

NEWCASTLE

Lord Londonderry visited the club last week in his Hornet Moth on the way to Thornaby. Last week C.A.G. members flew 85 hr. Fourteen have now gone solo. On December 7, Maj. Alan Goodfellow will address C.A.G. members at the Church Institute, Hood Street.

SOUTH COAST

High winds during the past week somewhat curtailed the club's flying activities. Mr. E. S. Cleeves, of the C.A.G., has gone solo. A tramps' party will be held on December 3. The club will be closed from 14.00 hr. on December 24 to the morning of December 31.

NORWICH

During the recent windy weather Mr. A. E. Firmin succeeded in keeping the club's glider at 500ft. with the launching wire attached to a car after the manner of a kite. The drag was strong enough to draw the car slowly backwards. Bad weather last week reduced C.A.G. flying to 2 hr. 40 min. On Tuesday evenings ground instruction is given to members.

BROOKLANDS

Over 80 hr. were flown by the club last week, during which 30 applications for membership were accepted. Work in connection with the Air Defence Cadet Corps' new headquarters will be finished by Christmas. A supply of equipment and technical charts for the use of cadets is being despatched by the Air League.

REDHILL

The flying time for last week amounted to 81 hr. Messrs. D. C. Beaumont and B. T. O'Reilly accomplished their "B" licence night flights. On December 16 a club dance will be held at Burford Bridge Hotel, near Dorking. Messrs. A. F. Thomas, R. F. Vaughan, D. G. W. Stewart, B. E. Joyner and R. C. Greenlees have gone solo.

AT THE SIGN OF THE FALCON

THE Reading Aero Club's annual dinner and dance last Friday was something in the nature of a conspiracy, if one is to believe Mr. W. Eugster (and there is no reason why one should not). Mr. Eugster, in an informal speech, explained away the presence of steak and kidney pudding on the menu. Both he and that other "technician," Flt. Lt. Tommy Rose, had decided that the safety of the club members required looking after, and with this in mind it was necessary to keep the centre of gravity as low as possible—hence the pudding.

He then drew a pathetic picture of Reading with no club and all C.A.G. (this with a furtive glance at Mrs. Commissioner Miles).

In reply, Chairman Tommy Rose was briefly flippant. He had a special word of praise for Mr. and Mrs. Prescott, the hosts of the Reading aerodrome's own hotel, The Falcon.

Sportingly Miss Amy Johnson rose and pulled Tommy Rose's leg about some maps of his that she had borrowed. Her difficulty in following the course that he had plotted on them was explained by the fact that the lines did not go from anywhere to anywhere.

After the dinner—at which were quite a few notabilities, including Mr. F. G. Miles, who had deferred his Paris Show visit specially in order to be present—the party retired to the club lounge, while the floor was cleared for dancing. The dance attracted close on two hundred members, friends and guests, and it was a good party that gradually disintegrated in the small hours of the morning—in spite of a near-hurricane (*vide* Mr. Beaufort) that raged outside.

THE INDUSTRY

Accessories at the Paris Show

IT will be recalled that last week *Flight* gave an advance review of the British accessory exhibits at the Paris Show. Heavy pressure on space does not permit any further detailed reference this week, but a number of stands are illustrated on page 509. In addition to those mentioned on that page, the following companies are represented, in most cases on the stands of associated French firms:—

Rotax, Ltd. (magnetos, generators, starters and landing lights); Aviation Engineering (Messier) Co., Ltd. (undercarriage Equipment); Avimo, Ltd. (engine accessories and aircraft oxygen equipment); The Dunlop Rubber Co., Ltd. (wheels, tyres, brakes and pneumatic and hydraulic actuating mechanism); Dzus Fasteners (Europe) Ltd. (cowling fasteners); Lodge Plugs, Ltd. (plugs and screening equipment); Rotol Airscrews, Ltd. (constant-speed feathering and non-feathering airscrews); Sperry Gyroscope Co., Ltd. (instruments); Tecalemit, Ltd. (aircraft fittings and factory and aerodrome servicing equipment); the Triplex Safety Glass Co., Ltd.; and the Zenith Carburetter Co., Ltd.

Airspeed Progress

AT the annual general meeting of Airspeed (1934), Ltd., the chairman, Mr. G. Wigham Richardson, said that it was a pleasure to be able to present accounts showing a profit on the year's trading of £21,155, which reduced the debit at profit and loss account to £69,781.

After referring to factory extensions to cope with the greatly increased Government orders, Mr. Wigham Richardson said that they had completed and delivered the two prototypes to which he referred last year, and had recently received the production order for these machinees. They had also received an order for two prototypes of another type of aircraft, but the manufacture of these had not yet commenced.

During the year they had received an order from the Government of India for two civil Envoys for the use of the Air Officer Commanding in India, and had converted one Oxford machine for the Director of Civil Aviation for research purposes. For the rest, they continued to receive supplementary orders for the Oxford, some of which had been supplied to one of the Dominions. In the matter of deliveries of this aircraft they were actually ahead of their contract schedule.

The Hawker Siddeley Year

SPEAKING at the annual general meeting of the Hawker Siddeley Aircraft Co., Ltd., the chairman, Mr. T. O. M. Sopwith, said that the programme for the immediate future was one of the utmost importance for the country.

No stronger incentive than that indicated by the recent political crisis for the speeding-up of our aircraft production programme need be advanced, and he felt that now was a suitable opportunity to express publicly the conviction that an organisation such as has been built up by the company was not only at present rendering service of inestimable value to the country, but they were also proposing to raise further capital, so that whatever the demands of the Government might be, private enterprise would be in a position to meet these demands in the most economical and efficient manner.

The essence of successful aircraft production was long-range planning based on a limited number of types, and to supply the numbers of aircraft required to-day would call for a greater and more sustained effort on the part of the industry.

Mr. Sopwith then went on to explain in detail the reasons for the proposed £5,000,000 increase in share capital (already referred to in these columns). The proposals were adopted.

The chairman's statement of the company's finances ended with a recommendation for the payment of a final dividend on the Ordinary shares of 17½ per cent., together with a cash bonus of 10 per cent., both less tax, making, with the interim dividend already paid, a total dividend on the Ordinary shares for the year to July 31, 1938, of 32½ per cent., together with a cash bonus of 10 per cent., both less tax.

Mr. Laurence H. Pomeroy, M.I.Mech.E., M.I.A.E., M.S.A.E., who is to practise in London as a consultant, especially to financial interests requiring expert advice on patents. He is well known to the aircraft industry as former general manager of the D.H. engine division and as present consulting engineer to that company.

Plessey's Annual

WITH the steadily increasing size of the Plessey organisation—the staff now numbers something like 5,000—very considerable paring down had to be done on this year's annual dinner list. Even so, among the large number of members of the staff there were about 150 guests, and the affair, which was held on November 19, went off in the usually cheerful manner.

Unfortunately, Mr. A. G. Clark, the managing director, was away in America on a business visit, and Mr. B. G. Clark, the company's chairman, was, through illness, absent from the dinner for the first time during the fourteen years in which it has been held. In the circumstances, Mr. J. A. Smith, the company's secretary, was in the chair, and the only other familiar names on the extensive toast list were those of Mr. H. Fletcher, who is one of the half-dozen who have been with Plesseys since the earliest days, and Major H. Parker, of De la Rue, who, as last year, replied for the visitors.

Metrovic Aircraft Production

UNDER the new aircraft production scheme in which Metropolitan-Vickers are interested, work has begun on a 30-acre factory at Trafford Park, Manchester, and will be completed, it is anticipated, in less than a year. Under the technical direction of A. V. Roe and Co., Ltd. (who are themselves erecting a new factory at Chadderton), assembly work will be carried on by Metropolitan-Vickers with six firms in Manchester, Bolton and Accrington as sub-contractors.

An English Taylorcraft

WHEN the C.A.G. scheme was first mooted, the suggestion was that it would be necessary to import quite a number of American light aeroplanes until such time as British manufacturers could themselves produce suitable types. During the past few months it has seemed that the need for such importations may not be as great as was first imagined.

Nevertheless, there are no British types which are in quite the same category as machines such as the Aeronca, Cub and Taylorcraft, and it sems likely that there will continue to be quite a reasonable market for these.

Apparently the Taylorcraft is to be built here by a subsidiary of Crowthers, of Leicester, and in order to make a rapid start possible the first batch of machines will be made up from parts shipped over from America. Later on many of the jigs and tools used at the American factory will be duplicated and sent over to England.

The company building the machines will be known as Taylorcraft Aeroplanes (England), Ltd., and the works will be at Thurmaston. Among the directors of the company is the chairman of Crowthers, who is a member of the County Flying Club and is at present in America studying Taylorcraft factory methods.

The actual machine to be built will be the new type with a 50 h.p. Continental engine, and will be stressed for aerobatic work. It is hoped that suitable British engines will ultimately be available.

STRUCTURAL DESIGN

A FORTNIGHT hence, on Thursday, December 15, there will appear a *Flight* Special Number of unusual interest.

Entitled "Aircraft Construction Number," this issue will review in detail modern trends in aerodynamic and structural design and materials. The utilisation of components such as engines, undercarriages and high-lift devices in relation to the complete design will be discussed in a number of authoritative articles. A separate section will be devoted to engine development.

THURSDAY FLIGHT DECEMBER 15